THE IRON AGE

ESTABLISHED 1855

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British Steel Labor Reports on Russia

ONE of the most interesting documents that I have seen for some time is entitled "Report of Delegation to the USSR." It relates the experiences of seven members of the British Iron and Steel Trades Confederation, the counterpart of our USW, who visited the Russian steel industry at the invitation of Soviet authorities.

The tour covered some 11,000 miles, and according to the members of the delegation had no "strings" on it with respect to places visited, questions asked and notes taken. "The main purpose of our visit," the report states, "was to see as much of the iron and steel industry of the USSR as we could in the time allowed and to obtain such information regarding the practice and conditions in the industry as would be of interest to our members. Nevertheless, we saw many other phases of Russian life and if we refrained from giving our impressions of what we saw of these, this report would lack a great deal of interest."

To me, and I believe to the readers of The Iron Age, these impressions are and should be of more interest than the technical descriptions, which may be summarized in the statement made that "the practice of steelmaking is quite up to date but nothing that is in advance of our own (British practice)."

As to living conditions, the report says that "the workers in Russia have a long way to go before they reach the standard of living existing here in Britain. Bearing in mind the conditions that existed in Tsarist days, this should not need stating but for the unbalanced picture we have been given and the extravagant claims made for Soviet achievement during the past 15 years, mainly by people who went there less to see what had actually been done than to prove to the world that the system in Russia was an outstanding success." Maintenance of equipment, say these labor delegates, is regarded as of little consequence. "A few more slogans about the care of the machine and a few less about the virtues of their leaders would not do the Soviet people any harm."

The report is frank and factual as evidenced from the following excerpts which should interest American steel labor and management:

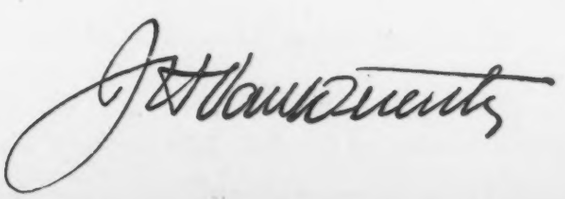
"Promotion to the better paid jobs on the process is by individual merit. Seniority does not count and the decision lies with the management after consultation with the trade union.

"Contributions (union dues) are not deducted from the wages, this, we were informed, being illegal.

"Only 5 percent of wages are paid on day or time rates, the remainder being on piecework.

"It is recognized that the functions and activities of the trade union may differ to some extent in a Socialist state from what they are in a capitalistic one, but never, in our view, to the point that seems to be accepted by the Soviet trade unions—that the workers' principal interests can safely be left to a workers' government. Our faith in the perfection of human beings, and particularly governments however well intentioned, has not yet reached that dizzy height."

All in all, this report, made by leaders of British steel labor makes interesting reading especially when compared with the account of a similar visit to the Russian steel industry recently issued by the USW of our own country. Perhaps it is because, as the farmer said of the Minsky chorus: "The farther away they are, the better they look."



We Don't Like "Quotas" Either

There are times when steel buyers must be on the verge of going berserk at the sound of the word "quota." We don't like quotas either . . .

But we have no choice, there just isn't enough steel to go around and we want to be fair with all of our customers.

We look forward to the time when *you*, the steel buyer, will tell *us* how much you will buy and we can strive to earn a large share of your tonnage.

In the meantime, while maintaining Inland quality and service at their usual high levels, we pride ourselves on an additional factor.

WE HAVE KEPT OUR WORD! . . . and, subject only to interferences beyond our control (strikes, etc.), we have made good. The commitments we have given our customers have justified their faith in INLAND as a RELIABLE SOURCE.

SELL YOUR SCRAP NOW!
More scrap is needed to make the steel so desperately needed by American industry.

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► Activity of veterans in industrial plants is the hottest potato in today's industrial labor picture. Both management and labor are hesitant to take action against some of the impossible demands of the veterans for fear of public reaction. Union leaders privately admit unfairness of certain veteran demands, notably vacations with pay but refuse to take a public position or publicly reprimand or discipline their union veterans.

► The automaker's purchasing agent often starts his day with a list of items in critical demand in his shops. The roster may range anywhere from 5 to 35 items -- parts, materials and assemblies which the plant must receive within 24-hr if the assembly lines are going to operate the following day.

► Though many have forgotten it, the draft problem still plagues some sections of industry. The National Tool & Die Manufacturers Association, pleading with Selective Service for help, has been told that greater consideration will be given to deferment of supervisory, technical and scientific personnel.

► Operating tests are scheduled to get under way soon on the surplus government-owned charcoal iron blast furnace at Rusk, Tex. Moved from a Pembroke, Fla., phosphate plant during the war (See The Iron Age, Nov. 15, 1945, p. 66), the furnace was swept from an active producing role by the changing tides of battle. With charcoal iron furnaces an industrial anachronism, the furnace may have some economic value through byproduct output if local outlets can be found for the iron.

► French reports indicate that American metal exporters are undercutting Belgian exporters as much as 35 pct in South American markets in order to maintain a strong position there.

► The Federal Government continues its tendency to demobilize the civilian payroll in reverse. Personnel, both inside and outside the United States, showed an overall increase of 22,561 in June over May, excluding War and Navy Depts. decreases.

"The conclusion that jobs have been manufactured in order that they (office workers) may be retained is inescapable," angrily declared Senator Byrd, Chairman, Joint Committee on Reduction of Nonessential Expenditures.

► Henry J. Kaiser's Eagle Mountains iron ore property, to which fee title has been acquired, may yet prove to be a legal volcano. Acknowledged to be the largest high grade deposit in southern California, and hence a keystone in long range operating plans of the Fontana steel plant, the property was not developed because the fee title did not carry with it mining rights. Kaiser believes he now has these.

► Commenting on General Motors expansion plans CPA officials have expressed the belief that subcontracts and purchases will bring General Motors expenditures in the Greater Cleveland area close to the $100 million a year mark.

► Army Ordnance has plans afoot for a hypervelocity wind tunnel and a companion hypervelocity free flight range which will permit speeds of eight to ten times the velocity of sound. According to its Industrial Preparedness Bulletin, by firing missiles in free flight in the hypervelocity range, which will contain refrigerated gases, tremendous velocities can be obtained and measurements taken by spark photography, Schlieren photography and interferometer techniques.

► Although actively presented to American industry only about 3 yr ago, crush grinding has become increasingly popular in both production and tool room operations.

The term crush grinding has been applied to any grinding operation for which the wheel is formed or trued by use of a roller that impresses its profile on the grinding wheel by rolling against it at reduced speed.

► Use of ultra highspeed photography (up to 3000 frames per sec) for analysis of such manufacturing operations as welding, forming and machining is proving to be an extremely valuable tool for studying these operations. Use of color film with ultra highspeed cameras has provided some interesting views of arc welding work.

► Under the noses of the Nazis, Philips research laboratories in Holland made a 2-reel film on atom splitting as part of their independent atomic research program conducted during German occupation. Sections of this film appear in the new March of Time film, "Splitting the Atom."

► A Rumanian economic mission headed by Nicholas Malaxa, that nation's leading industrialist, is due to arrive in the United States this week. Its purpose is to organize heavy industry for Rumania in which American firms and Russian interests will share in profits and control. The mission left Rumania with the knowledge and consent of Soviet authorities, who have so far not indicated their sentiments on the industrial veto.

Production Experience Proves

By C. J. LINXWEILER and R. Y. MOSS
Sheffield Corp., Dayton

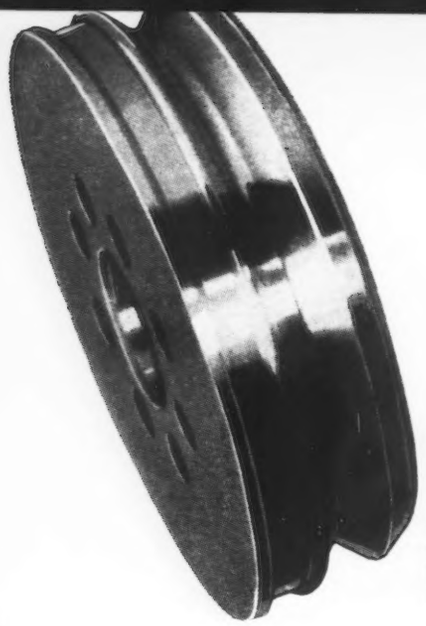

FIG. 1 — Circular form tool produced in quantity in 14 min by grinding from the solid, or in 4 min when preformed. Dimensions of this tool are given in fig. 2.

CRUSH grinding was actively presented to American industry about three years ago. Since then its use has increased many times and its advantages are increasingly apparent to manufacturers who use grinding machines in their production or toolroom operations.

The term crush grinding has been applied to any grinding operation for which the wheel is formed or trued by use of a roller, generally of hardened material, which impresses its profile on the grinding wheel by rolling against it at reduced speed.

Vitrified grinding wheels, when crush trued, have certain basic advantages for numerous applications. The greatest use of the method has been for the reproduction of shapes or profiles. In contour grinding it is generally necessary to use a grinding wheel of great enough hardness that the wheel shape will be maintained through one or more complete grinding cycles. Wheels possessing appropriate characteristics for this purpose when diamond trued are apt to cut slowly and may burn the product. Similar or identical grinding wheels, when crush trued, produce much cooler and much faster metal removal with resultant increases of quality and quantity.

Crush grinding has proved repeatedly to be the simplest dressing procedure for a complex wheel contour. It is only necessary to produce in a roll the profile or contour desired in the work and then use that roll to produce a complementary form in the

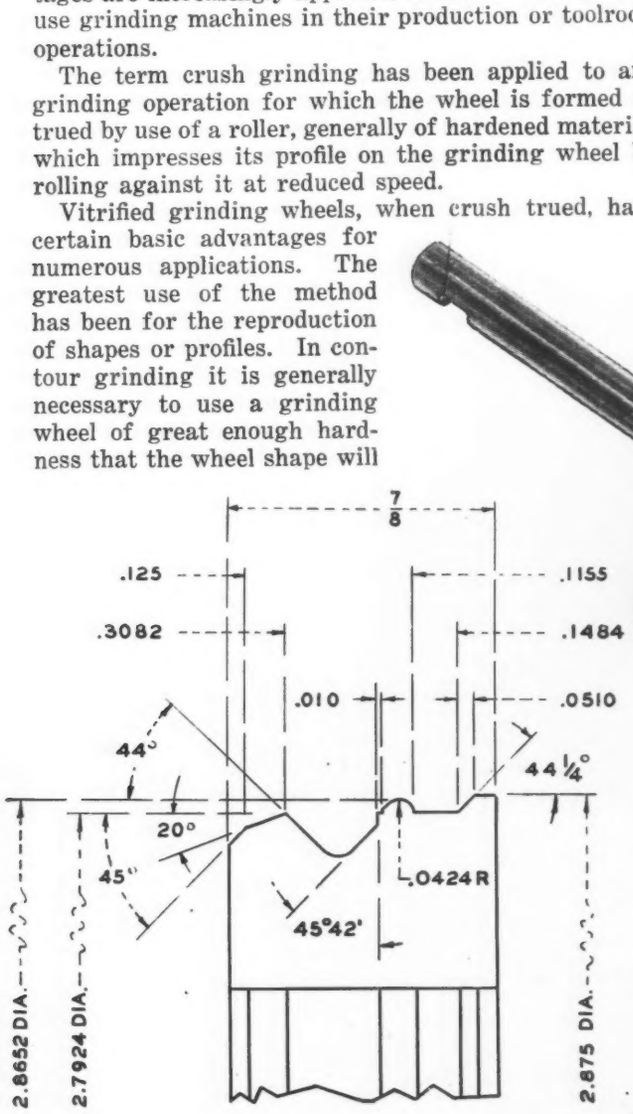

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FIG. 2—Details of the form tool shown in fig. 1, showing the intracacy of the form. Decimal dimensions are held to a tolerance of ± 0.001 in.

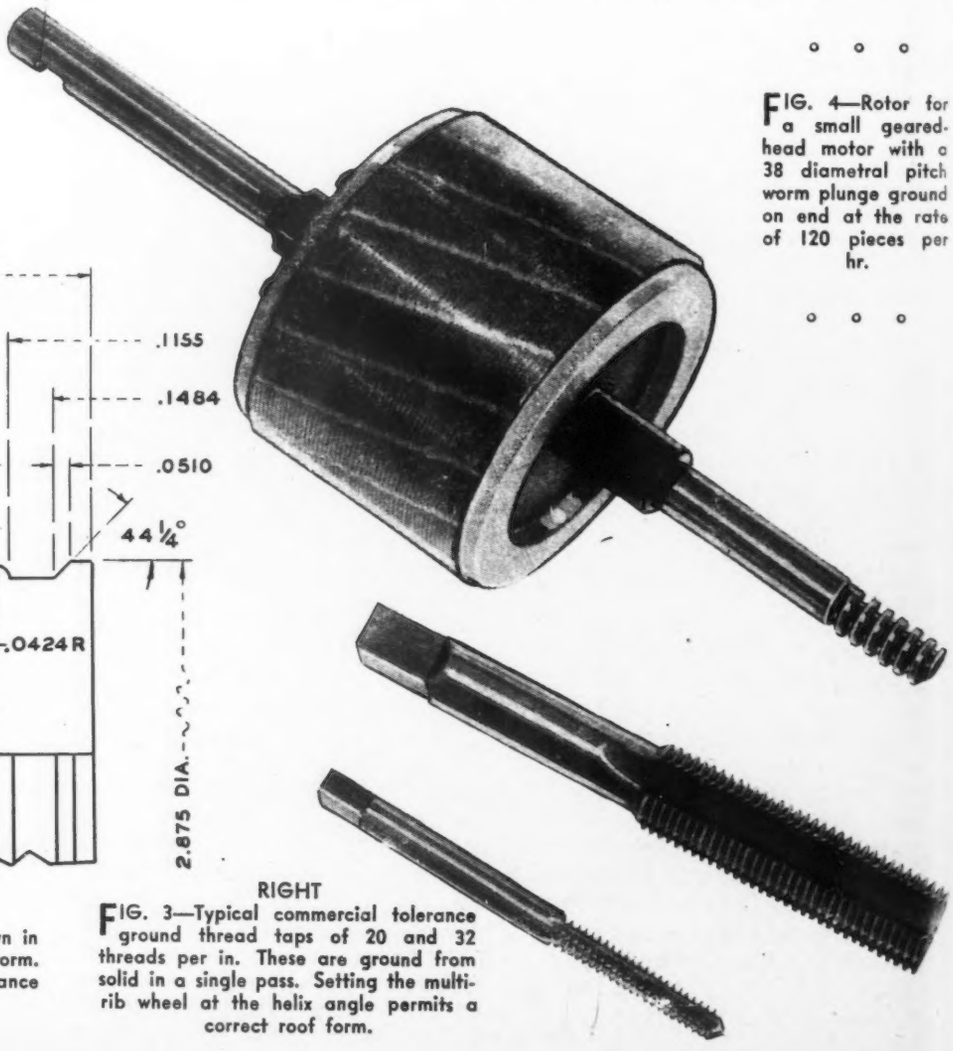

FIG. 4—Rotor for a small geared-head motor with a 38 diametral pitch worm plunge ground on end at the rate of 120 pieces per hr.

RIGHT

FIG. 3—Typical commercial tolerance ground thread taps of 20 and 32 threads per in. These are ground from solid in a single pass. Setting the multi-rib wheel at the helix angle permits a correct roof form.

Economy of Crush Grinding . . .

Although only about three years old, the crush form dressing of grinding wheels is coming into rapidly increasing use in both production and toolroom operations. The process is described herein, and actual case histories are given to show the economies that can be effected over conventional grinding methods.

wheel, which in turn duplicates the original desired shape in the workpiece. The machine change from one part profile to another is extremely simple, involving only a change of rolls and the presentation of a fresh wheel surface for truing. This reduced setup time in comparison with diamond trued grinding of one element at a time, or the maintenance of a complex diamond truing device, greatly reduces job change cost and makes the crush grinding of small order quantities most practical.

The limitations of the process are similar to those that exist with any truing method where deep or complex forms are required. It is difficult and in some cases nearly impossible to maintain a square shoulder on the wheel or the work where that shoulder is normal to the axis of the grinding wheel. Extremely deep contours can be crush dressed but contribute to accelerated crusher wear where long run production is expected.

The advantages cited make the crushing process of grinding most practical for common production grinding problems which have been the subject of recent tests and experience. Crushing, for example, has permitted thread grinding to compete economically with helical form milling and multiple thread milling as a high production method.

A typical example of this economy is the manufacture of quantities of identical circular form tools such as that illustrated in figs. 1 and 2. A large manufacturer's previous practice has been to rough form these high speed steel tools, heat treat and then finish grind an element at a time on a universal toolroom grinder, using optical projection as a checking method. Long experience has shown that the finish grinding time is around 4½ hr per tool with skilled, seasoned operators. These tools are manufactured in lots of 24 to 30 pieces every three months.

With the application of crush grinding procedure to this job, a machine was used which had been built specifically for the process. It was found that the grinding of the crusher roll took about the same amount of time on the Micro-Form grinder that was required for the manufacture in previous lot production of one of the circular form tools. In a setup

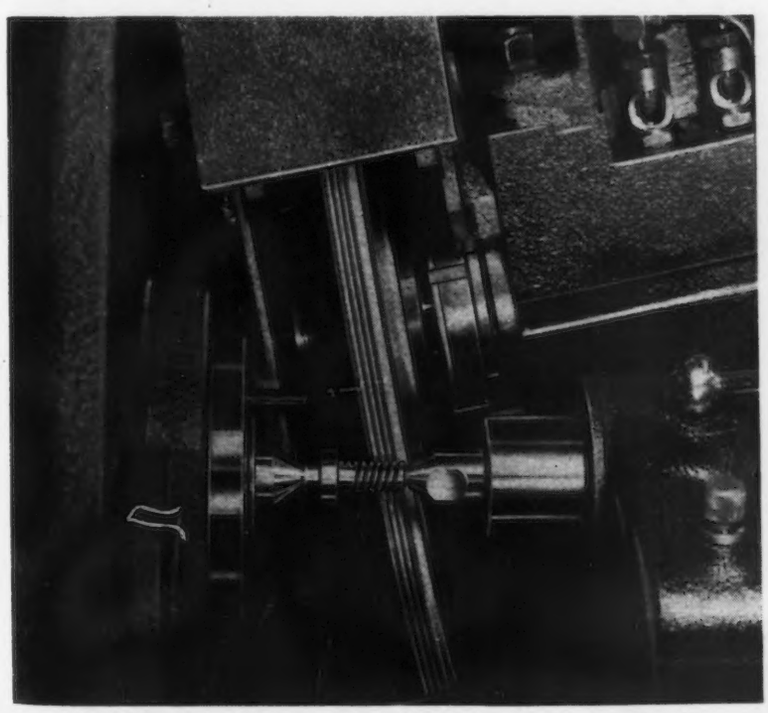

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FIG. 6 — Automotive steering knuckle with ¾—20 thread ground as the final operation. Grinding time was 14 sec; production, 120 pieces per hr.

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FIG. 5—Setting grinding wheel at work helix angle permits plunge thread grinding of small worms such as the 32 diametral pitch worm shown here.

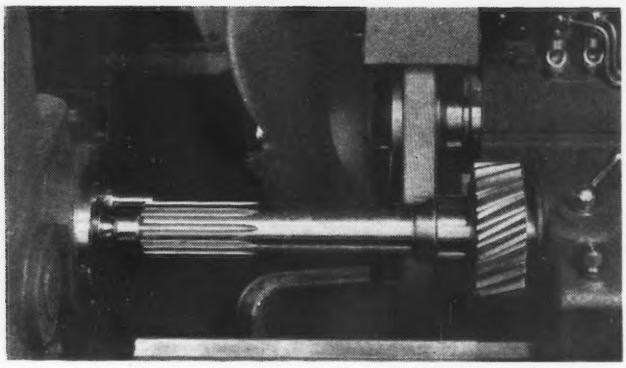


FIG. 7—Bearing retainer with the thread plunge ground as the final operation on a transmission gear.

requiring approximately 30 min the form was crushed on a grinding wheel and the machine was ready to grind parts. As an experiment the work came to the machine in two conditions. In the first case the blanks were cylindrical, not preformed in any way. It required about 14 min each to grind these tools from the solid to finished shape at about 64 Rc.

The alternate case brought the preformed tools to the grinding operation identically as previously placed on the universal toolroom grinders with 0.015 to 0.020 in. stock to grind. Greater wheel life and crusher life were obtained while the time to grind a tool was less than 4 min.

Comparing the previous grinding time of 270 min with the crush grinding time of 4 min, a time savings per tool of 98.5 pct is apparent. The same process may be used for the manufacture of quantities of working crusher rolls in any case where the total of the quantity is for three or more pieces. The handling of repeat orders is greatly simplified, requiring only the resetup of the machine with the master crusher roll and the wheel which normally is stocked as a special tool after it has once been dressed to a required shape.

Commercial production thread grinding with a multirib grinding wheel is ordinarily done without any use of helix angle setting of the grinding wheel. This simplifies the setup for any particular job and assures that the original lead accuracy of the crusher roll will be duplicated in the work. For the production of Class 3 tolerance in commercial threads where ¼ pitch minimum root clearance is permissible, this method has proved very satisfactory.

There is a small amount of helical interference between the wheel and the work when grinding with zero helix angle wheel setting, and this interference is sufficient to prevent meeting tap manufacturer's standards for root clearance. Production grinding of taps in pitches as fine as 28 and 32 has been done successfully by setting the multiribbed grinding wheel at the pitch line helix angle of the product. This eliminates the consequences of helical interference but makes it necessary to shorten the lead spacing of the crusher roll in the proportion of the cosine of the helix angle setting. Using this procedure with a 320 grit wheel, 28 and 32 pitch taps, fig. 3, may be ground from the solid in grinding times of 30 sec per tap or less, while holding root clearance within the basic U. S. form requirement of ⅛ pitch or sharper root width.

The normal plunge grinding practice of pulling the wheel into full depth is changed to the extent that the plunge time is distributed over at least two turns of the work while a higher work speed is used. On the comparatively frail finer pitch taps this is desirable for the elimination of work deflection in the grinding operation. A single machine cycle will produce commercial grind tap tolerances grinding from the solid.

The practice of setting a multirib wheel at the work helix angle to minimize helical interference effect has reopened studies of small worm grinding with highly satisfactory results. For pitch line helix angles up to 15° it has been found that the crusher roll can be made to normal gear tooth rack form in the range from 20 to 60 diametral pitch with no additional correction of form required. With the wheel in face widths up to 1 or 1¼ in. set at the appropriate helix angle, small commercial worms may be plunge ground or traverse ground from the solid at high rates of production.

Fig. 4 shows a typical single start 38 diametral pitch 14½° pressure angle worm ground from solid steel at an average production rate of 115 to 120 pieces per hr over an 8 hr working day. Fig. 5 shows a 2 start 32 pitch bronze worm plunge ground from the solid in 35 sec with both starts beginning and ending within the length of the part.

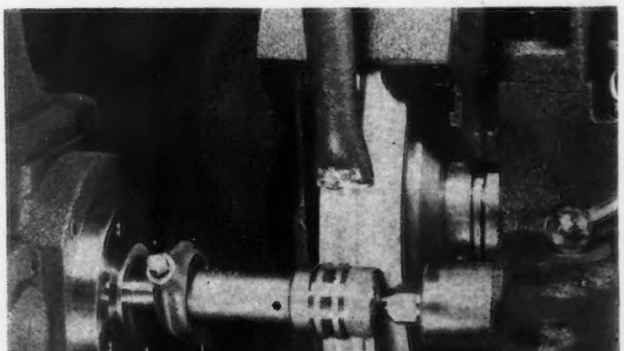
The plunge grinding of multiple starts is limited in its application by the fact that the multiple threads begin or end at the same angular position on the workpiece. In some product designs this will cause interference with shoulders, bearings, etc. It has been found frequently that designs can be modified in the interest of obtaining the high production made possible by plunge grinding.

Where helix angles as high as 20° are required in worm grinding it may be necessary to make additional corrections in crusher profile, in order to compensate for wheel and work contact above and below the axial plane of the work at the ends of the thread portion. Normally the amount of this correction is very slight.

The automotive and tractor industries are finding an increasing number of applications for multirib plunge thread grinding in threading important components. Automotive parts which can be plunge thread ground with economy and quality are such items as the rear drive stem pinion, the steering knuckle and several bearing securing threads on transmission spline shafts and gear shafts, as shown in figs. 6 and 7.

One large manufacturer has found that aside from a favorable comparison of direct threading operation cost, it is also possible to eliminate copper plating operations for protection of thread areas through heat

FIG. 8—Crush grinding permits rapid stock removal for grinding special bearing race profile to precise form.



treatment, that it is possible to maintain great coaxiality. It is also possible to make threading the final operation in manufacture of the part, avoiding the danger of thread damage in handling during the other operations.

A typical automotive steering knuckle with a ¾—20 Class 3 thread 1-in. long is ground from the solid as a final operation in 14 sec of actual wheel contact, or at an overall production rate at 120 pieces per hr after normal operator allowances have been made. Burrs at keyways and cotterpin holes are eliminated.

Another broad field of application for plunge grinding is similar to form tool grinding in that the forms produced are annular in nature. The ball bearing industry is finding increasing demands for sealed types of bearing assemblies such as that shown in fig. 8. Most designs of this class of bearing call for more or less intricate profiles on the outside ends of the inner race. These forms can readily be produced by the crush grinding method, meeting normal surface finish specifications and normal accuracy requirements.

Bearing manufacturers are finding it desirable to semi-finish grind the ball race radius in connection with the finish grinding of the seal diameters, and current experience permits the conclusion that it may soon be possible to finish grind the ball race radius simultaneously with the seal contours. The cool, fast cutting made possible by wheel crushing permits high production even where excessive metal removal is required.

Wide differences of opinion have developed on the best approach to various details of the crush grinding process. One of these differences concerns the choice of coolants to be used with crushing. As a consensus of today's practice, it may be said that grinding oils are used almost exclusively in production applications of crush grinding. The oil enhances crusher performance and crusher life in the truing operation, apparently reducing pressure as a result of reduction of friction and abrasion in roll-wheel contact.

In grinding operations with any truing method, grinding oil has demonstrated an ability to maintain irregular wheel profiles for a longer period. This applies to crush truing as well as any other truing method. Those oils, which have a capacity for partially or fully wetting the surface of contact between the wheel and the workpiece, seem to give the highest return in stock removal and extension of wheel life. Water soluble grinding coolants have been used and are used in different crush grinding applications, but the results reported from those jobs do not compare too favorably with normal expectancy from the use of a grinding oil.

Especially in toolroom applications, dry crushing has been used with reasonably satisfactory results. This dry crushing has been used on coarse grit wheels frequently, employing grades and grains previously used with diamond truing. In some jobs a stiff brush is run against the wheel or the roll during the crushing operation, and in other cases a jet of compressed air serves a similar purpose of helping remove displaced grit. As a summary, it would probably be correct to say that dry crushing has been found superior to crushing with water soluble coolants.

Various wheel manufacturers have cooperated extensively with the manufacturers and users of crush grinding, and have in some cases conducted extensive tests in their own laboratories with the object of improvement of wheel specifications for crush grinding. The wide variety of abrasives, bonds and wheel densities would make it very difficult to specify exactly what grinding wheels are best suited to crush grinding. However, for use with oil as coolant the general choice of grit size is in the range from 120 to 320.

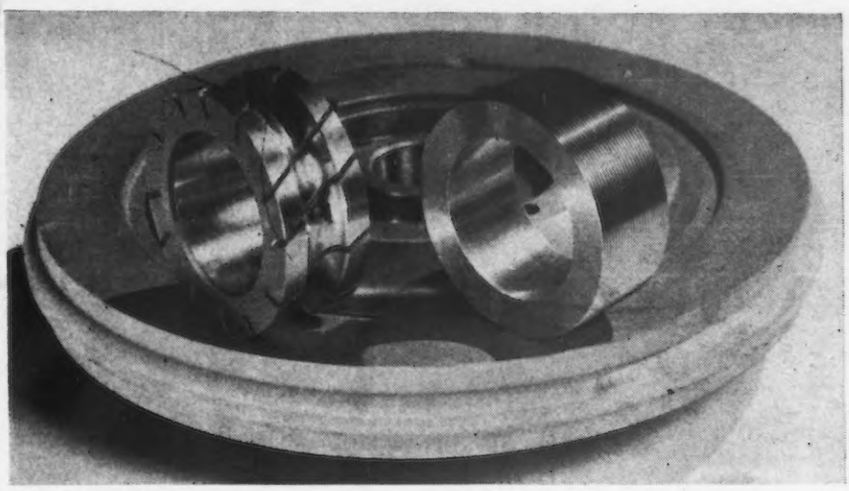


FIG. 9—Two typical crusher rolls and a wheel formed by one of them. Special form rolls are generally gashed, while standard thread rolls are not.

The wheel is frequently a combination of two or more grit sizes in this range.

Aluminum oxide is the more common grit probably because the majority of grinding problems are in materials for which aluminum oxide is the preferred abrasive. No crushing trials in bonds other than vitrified have been favorable. The resilience of organic bonds prevents sufficient localization of pressure at the point of wheel and roll contact to fracture or break loose individual particles. The structure and density of wheels for crush grinding is in general very similar to that which is used for other truing methods. Where high work speeds are involved the wheel hardness should probably be increased slightly.

Much thought and effort has been devoted to the choice of materials for the manufacture of crusher rolls. Actually the operation can be done successfully with any materials in the broad range between soft, mild steel through the hardest of the cemented carbides. In most applications it will be desirable to balance the cost of the material and making the crusher roll, as well as regrinding, against the life of the precise form obtained with that roll material.

Comparative tests of a variety of materials indicate that the standard tungsten types of high speed steel and the abrasion resisting, high carbon, high chromium steels which are fairly easy to grind will give the most economical crusher life. The super alloys of iron, the chromium carbides and the cemented carbides will provide longer roll life per reconditioning of the roll, but show a disproportionate original and reconditioning cost. The need remains for even wider

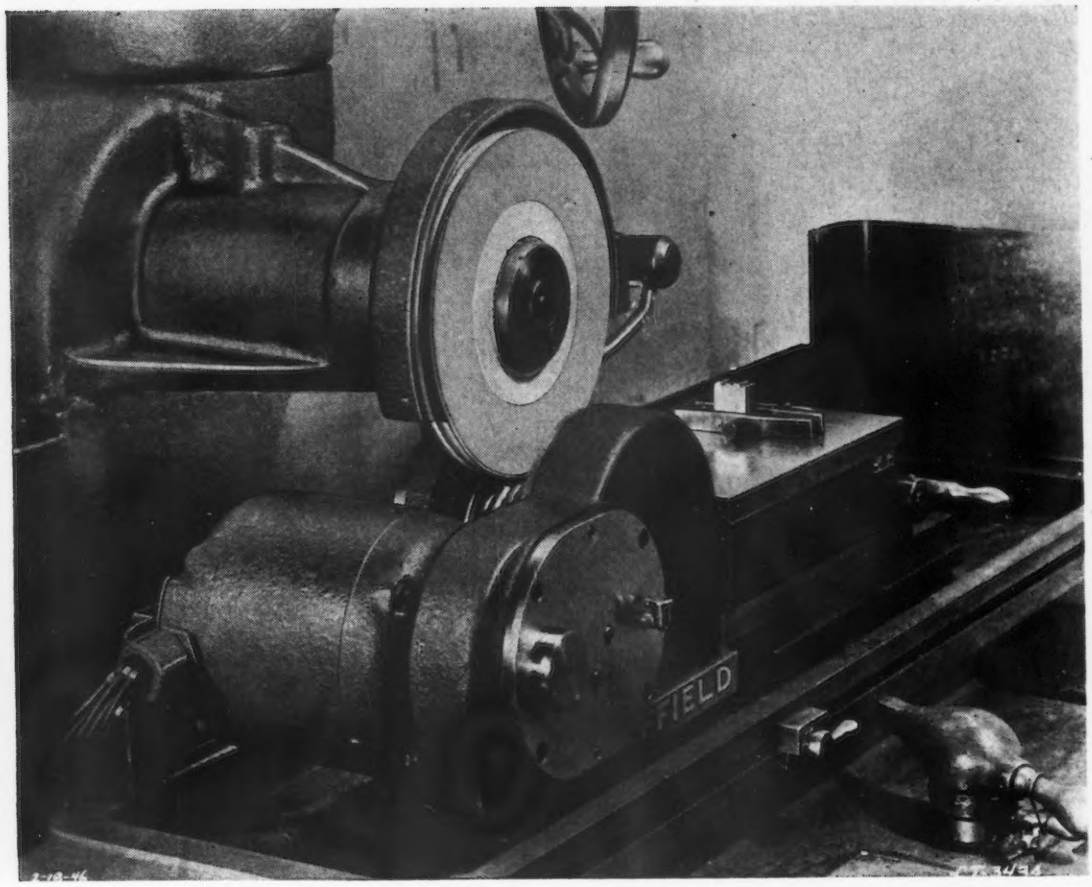


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FIG. 10—A motor-driven crushing fixture provides a simple means of using the method on any surface grinder.

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studies of materials for the making of crusher rolls.

Different users of crush grinding have different practices on the matter of the irregular gashing of the crusher roll surface and it is felt that these gashes, or slots, in a roll, serve several useful purposes. They tend to reduce crushing pressure by permitting periodic penetration of the outer wheel surface by the sharp corners. They provide channels for the washing out of displaced grit by the coolant and on deep profiles they tend to keep a more even distribution of crusher wear over the entire profile. See fig. 9.

On the most commonly used crusher forms, however, such as standard U. S. form threads, crusher life is almost identical with or without the gashes. As a result, American and European manufacturers of crusher rolls have generally discontinued the gashing of thread form rolls. There are probably enough benefits to be obtained by gashing that the method should logically be used on deep special forms in all cases, leaving other applications to the users option.

The crushing operation is carried out at reduced speed of the grinding wheel. In most instances this reduced speed is about 5 pct of the speed used in grinding with a vitrified bond wheel. The crushing can be done successfully at higher surface speeds than this with accelerated crusher wear results. At slower speeds the time required for the truing operation is increased. Consequently the speed range from 200 to 300 sfpm offers a satisfactory compromise rate.

The user of crush grinding may have the option of letting the crusher roll drive the wheel to produce this slow speed, or may have the grinding wheel turned at reduced speed by an auxiliary drive with the dressing roll an idler. Crusher life is usually greater where the roll is an idler, even in those cases where more torque is required to turn the roll than is required to rotate the wheel and its connecting elements. This fact would support a conclusion that the member of least inertia, rather than the member of least resistence to rotation, should be the driven member in the crushing operation.

For maximum convenience in mounting and installation, two types of surface grinder crushing attachments have been made available. The so-called idler type makes it necessary for some auxiliary drive to be furnished. This is most frequently arranged through gear head motors with various types of connections. It may also be done manually by cranking the grinding wheel spindle.

The motorized surface grinder fixture, fig. 10, which provides for the roll to drive the wheel, offers the greatest simplicity of application and may be desirable for this reason. It may be difficult to compare the difference in crusher life between the two devices because the factors of machine construction, wheel width and grade, material ground, coolant, profile of roll and technique of operator are all pertinent factors in such comparison.

German Wartime Technical Developments

REPORTS of German practice in numerous technical fields of interest to engineers and executives in the metalworking field, issued recently by the Office of the Publication Board, Washington, are briefly described below. These reports are in addition to detailed articles of certain phases of German practice previously published in THE IRON AGE.

Copies of the reports listed below may be obtained in either photostat or microfilm form, as indicated. Orders for copies of these reports should be addressed to Office of the Publication Board, Department of Commerce, Washington 25, giving the "PB" identification number. See THE IRON AGE, June 27, p. 67, for a list of earlier reports.

Supersonic Testing—A German method for detecting lamellar defects in rolled metal plates by supersonic methods is described in a report by A. K. Hutton. Supersonic impulses of 1 million cycles per second in 5-mm wave lengths were passed through the material. Contact with the metal was made through a water film. *PB-16705; photostat, $1; microfilm, 50¢; 12 p.*

Turbines—A closed cycle gas turbine, axial compressor, propellers, variable pitch hubs, and other products developed by the Escher Wyss Co., Zurich, Switzerland, are the subject of ten reports. A list giving the contents of each report and cost may be obtained from the OPB or THE IRON AGE.

Titanium—Extensive wartime research of titanium in Germany may offer unusual possibilities for the future use of this metal by the electrical, the machine tool and other industries, according to a report covering the only German titanium manufacturing firm, Titangesellschaft, prepared by F. H. McBerty of the Technical Industrial Intelligence Branch. The report states that titanium may have extensive uses in the field of dielectrics and, in the carbide form, may become more than a mere substitute for other carbides in high speed tools where minimum wear is required. *PB-22625; photostat, $5; microfilm, $1; 63 p.*

Steam Turbines—New German methods for reducing the size and cost of steam turbines include the use of a low-pressure bottom half casing which is integral with the condenser structure, according to a report by M. L. Ireland, Jr., investigator for the Technical Industrial Branch. The report covers the main propulsion steam turbine machinery of German merchant vessels. *PB-16698; photostat, $6; microfilm, $1; 87 p.*

Protective Coatings—A temporary protective coating for metal parts developed by the German firm of Vereingte Lackfabriken is described in this report. It is stated that the coating was effective against rust, corrosion and salt water, and that it would not melt when exposed to the direct rays of the sun. The coating was composed of a mixture of wool fat, chinawood oil, natural resin, white spirits and a soluble dye. *PB-22825; photostat, $1; microfilm, 50¢; 3 p.*

Engine Design—An unconventional type of air-cooled gasoline engine, with ten cylinders, was being developed in Germany for use in military vehicles at the end of the war, according to a report by A. W. Pope, Jr. The engine's ten cylinders are arranged in V form, in two banks of five cylinders each. The ratio of stroke to bore is 0.95. The engine unit, including an electric generator for electric drive to the vehicle, weighs 1380 lb and is rated at 300 hp. *PB-18778; photostat, $1; microfilm, 50¢; 4 p.*

Nickel Substitute—A metal substitute for nickel in radio tube electrodes has been developed by the Germans and found to be cheaper and to have more desirable qualities for some applications, according to a report by M. J. Gross which describes the composition and manufacture of this metal, as well as a glass solder and metal-ceramic tubes. The metal substitute for nickel consists of an oxygen-containing iron sheet, plated on both sides with silicon-containing aluminum layers approximately 0.01 mm thick. *PB-17553; photostat, $2; microfilm, 50¢; 21 p.*

Fluorescent Screens—German research on fluorescent screens for infrared telescopes is described in a report covering an investigation of the Carl Bosch Laboratory, Berlin. Much of the report deals with developmental research of an image transformer and the development of plastic materials for the assembly of electrostatic high voltage generators, which increased the period of constant use from 24 hr to 5000 hr. *PB-6653; photostat, $1; microfilm, 50¢; 73 p.*

Current Rectifier—A German copper contact rectifier which converts ac to dc with 98 pct efficiency, developed by Siemens-Schuckert, Berlin, during the war for use in electroplating, aluminum extraction, chlorine manufacture and other electrolytic processes, is described in three reports. The German rectifier is said to be 10 pct more efficient than the mercury arc converter now generally used in the United States. *PB-3477; photostat, $3; microfilm, 50¢; 39 p. PB-3470; photostat, $1; microfilm, 50¢; 30 p. PB-6633; photostat, $1; microfilm, 50¢; 2 p.*

Iron Powder—A new method of preparing iron powder directly from pulverized iron ore by reducing the ore at low temperatures is described in a patent application filed in Germany by the Kaiser Wilhelm Institut fuer Eisenforschung, an iron research institute in Duesseldorf. Copies of the patent application, text in German, are available. *PB-13827; photostat, $1; microfilm, 50¢; 3 p.*

Acetylene Handling—Methods used in Gemany for handling acetylene in chemical operations at unusually high pressures and temperatures are described in a report by N. A. Copeland and M. A. Youker. Solving some of the safety hazards involved has made possible the manufacture of many products requiring the use of acetylene under high pressures and temperatures, the report states. *PB-20078; photostat, $16; microfilm, $2.50; 235 p.*

Surface

ALUMINUM novelties may be etched to produce a satin finish, followed by highlighting the raised design portions. Deep recesses are color enameled, and the whole article then coated with clear acid and alcohol-resistant enamel.

A review of latest methods of finishing aluminum and its alloys by chemical treatment, electrolytic oxide formation and electroplating, is presented in this series of three articles. This first article covers the various chemical treatments, and gives details as to bath composition, time, temperature and procedure.

ALUMINUM has advanced to a position of considerable importance in the commercial field during recent years, and the public has become increasingly aware of its future potentialities. Also the natural attractive appearance of aluminum has frequently been a decisive factor in its selection for particular articles.

In a large number of cases aluminum may be used without finish and protective coats, due to the natural formation of a transparent, inert, oxide film on its surface. However, supplementary protective finish coatings should be applied to the metal in cases where there is an expectation that the oxide film may be attacked or destroyed by corrosive environments.

A porcelain enamel coating for aluminum was described by Mr. Mason in the article "Porcelain Enamel Coating for Aluminum," THE IRON AGE, Aug. 15, 1946, p. 60.

There are many finishing processes and materials currently available which produce beneficial and attractive effects on aluminum and its alloys. Normally, these are easily and economically applied after competent instruction. They serve the dual purpose of increasing the corrosion resistance of the metal, and of augmenting its surface appearance.

Chemical treatments are among the most commonly used, and in some cases these treatments etch and brighten the surface of the aluminum, but in others protective surface oxide films are formed on the metal. These oxide films provide additional corrosion protection, but they are not particularly resistant to abrasion. The former treatments tend to lower the corrosion resistance by removing the natural aluminum oxide film present on the surface. These should be followed by supplementary processing to provide adequate corrosion protection.

The chemical oxide films produced on aluminum and its alloys may be colored or dyed with organic dyes. In most cases, however, the colors so obtained are not as good as those obtained on oxide films formed by electrolytic means. Many chemical oxide films constitute excellent paint bases due to their porous nature.

The decorative silvery-white finish obtained on aluminum and its alloys by chemical means is commonly referred to as a frosted finish. There are several chemical solutions for producing this surface appearance, but the compound most generally used is sodium hydroxide (caustic soda) in water. The finish is not permanent and is susceptible to marking and fingerprints. This treatment is really an alkali cleaner or etchant and serves as a base for the application of clear chemical or electrolytic oxide films.

ALKALI ETCHING—As stated previously, a caustic soda solution is frequently employed for etching aluminum. The solution concentration is generally 10 pct by weight, but it may be made stronger or weaker, as desired. The solution is maintained at a temperature of 150° to 180°F and the work is immersed for ½ to 1 min. If streaking occurs on drying, a second immersion in a 2 pct solution of caustic soda eliminates this to a considerable extent. The work should be rinsed in cold running water immediately after etching.

After rinsing, it is immersed in a cold 50 pct nitric acid solution to remove the dark smut deposited by the caustic solution and to neutralize any of the remaining alkali on the metal surface. The acid concentration may be varied between 20 and 50 pct. The work is then rinsed again in cold running water and dried. If aluminum alloys high in silicon content are being treated, it will be necessary to add a small percentage of hydrofluoric acid (1 pct) to the nitric acid solution

Finishes for Aluminum . . .

By J. F. MASON
Reynolds Research, Glen Cove, N. Y.

to obtain good results. Hydrofluoric acid solutions must, of course, be used in lead-lined tanks.

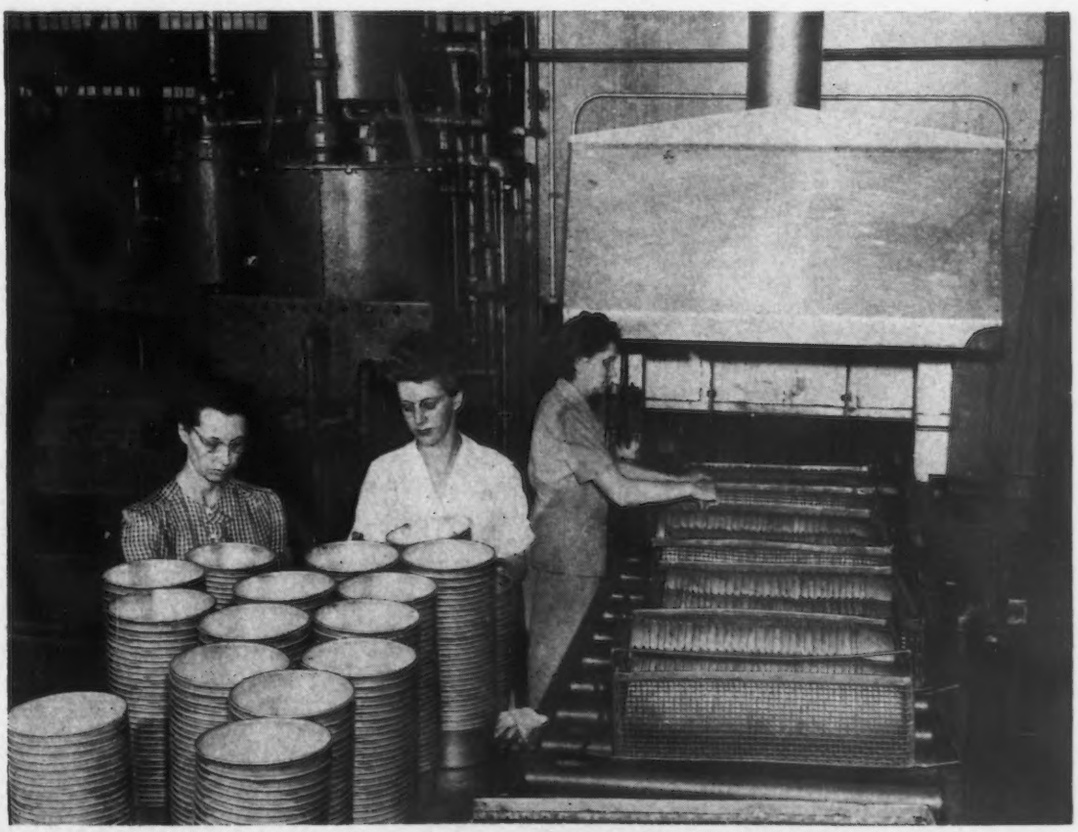
A solution consisting of 4 pct sodium fluoride and 5 pct sodium hydroxide may be used for etching aluminum. This solution is maintained at 160° to 180°F and the parts are allowed to remain in it for about 1 min. After this treatment, the work is rinsed, immersed in a 50 pct nitric acid solution, and then rinsed again. This produces a surface having good light diffusing properties. It should be given a supplementary treatment for protection against oxidation.

ACID ETCHING—Aluminum may be etched by immersion in a solution consisting of 30 pct nitric acid, 2 pct sulfuric acid and 4 g per liter of sodium chloride. The solution is maintained at 210° to 212°F, and the parts are allowed to remain in it for about 15 min. This produces a silvery-white aluminum surface, but one which is susceptible to marking and fingerprints; therefore, a supplementary clear chemical or electrolytic oxide film should be applied for protection.

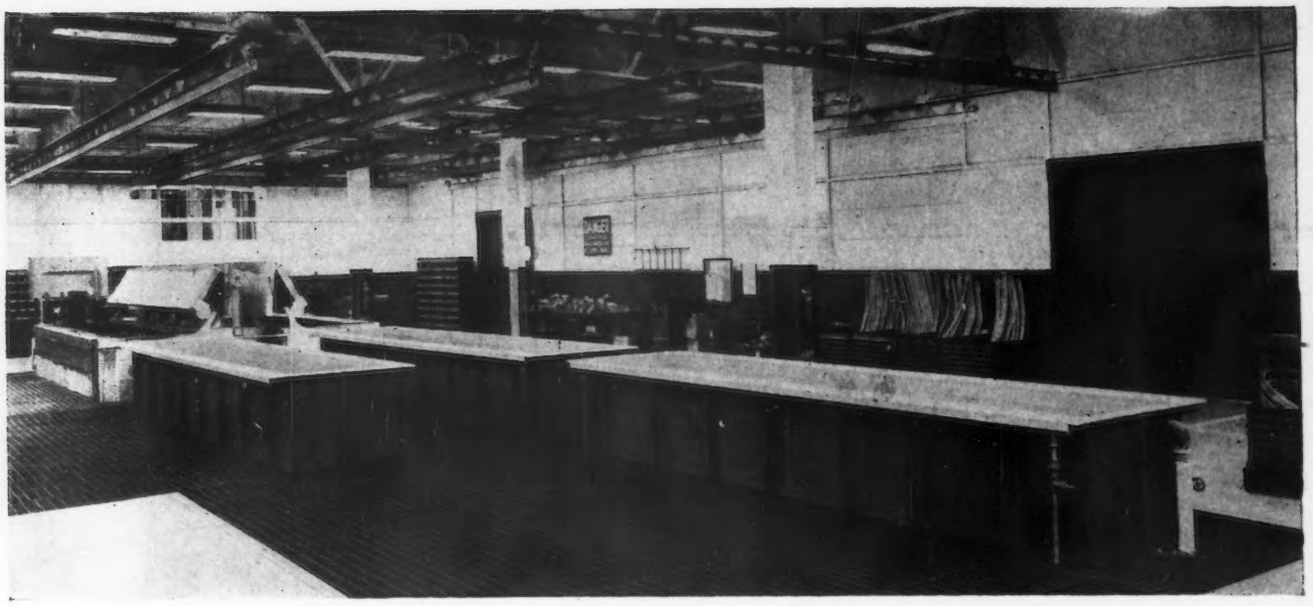
In some cases it is desired to remove the stains on aluminum alloys that have been heat treated. This may be accomplished by immersing the work in a cold solution of 1 part hydrofluoric acid and 4 parts nitric acid in 95 parts of water. This treatment is followed by a rinse in water, then an immersion in 20 to 50 pct nitric acid, after which the parts are again rinsed and dried.

DESIGN ETCHING—A chemical method for producing designs on aluminum entails printing the design on the metal, and then dusting the ink dampened areas with asphaltum powder. After this step, the excess powder is tapped off, and that remaining on the ink is baked at a fusing temperature of approximately 400°F. The work is then further processed by activating the unprotected areas by immersion in a 10 pct hydrofluoric acid solution and rinsing. The next step is an immersion of the parts in an etching bath, such as an iron chloride and hydrochloric acid solution, which acts on the unprotected areas of the aluminum to etch the desired design on the metal. A rinsing operation follows to remove traces of the acid from the parts. If a colored background is required, the work is further processed by applying a colored anodic or paint film before the asphaltum is removed from the protected areas by an organic solvent.

ALROK PROCESS—Oxide coatings may be produced on aluminum surfaces by chemical immersion processes which are patented by the Aluminum Co. of America under the trade name of Alrok. One method specifies immersion of the work in a hot, about 150°F, solution of 2 pct sodium carbonate and 0.1 pct potassium dichromate for a period of about 20 min. The pores of the oxide film thus formed are sealed by a subsequent immersion in a hot solution of 5 pct potassium dichromate, and the parts are then rinsed. The absorbed dichromate neutralizes any residual alkali in



DEGREASING is a most important step in many cleaning cycles preceding the application of various finishes on aluminum. Automatic conveyorized vapor degreasers greatly facilitate the operation.



Typical treatment room in the Boeing Aircraft Co.'s Seattle plant for the chemical processing of aluminum.

the coating and tends to increase its protective power. The Alrok films so formed vary in color, dependent on the alloy treated, but are usually a yellowish-green after sealing in dichromate. Oxide coatings produced by chemical means are thinner, softer and more porous than those obtained by anodic processes. However, they are more economical and easier to apply. Thesc coatings may be dyed, but the colors obtained are not as good as those on electrochemical films. Alrok films are quite effective as paint bases.

MODIFIED BAUER-VOGEL PROCESS—The modified Bauer-Vogel process is of considerable commercial importance in the foreign field for the production of a protective oxide film on aluminum and aluminum alloys free of copper. This process was developed in Germany to modify the original Bauer-Vogel process by eliminating alum and substituting sodium chromate for potassium dichromate. Appreciable time is saved by this modification; for example, the time of treatment was reduced from 2 to 4 hr to 3 to 5 min. The solution used is quite economical and has a long life.

The treatment involves immersion of the work in an aqueous solution of 5 pct sodium carbonate and 1.5 pct sodium chromate at 195° to 212°F for 3 to 5 min, then rinsing in water. The surface film formed is a slate gray. It has a fair adhesion and abrasion resistance, and makes a good base for painting and coloring. Its hardness and corrosion resistance can be increased by immersing it in a 3 to 5 pct sodium silicate solution for 15 min. The temperature of the solution is maintained at about 195°F.

JIROTKA PROCESS—This is a process for producing a film of aluminum oxide on aluminum and its alloys by immersion in acid, alkaline or neutral baths. A thin, metallic coating is embedded in the oxide film so formed. This may be partially oxidized by a longer period of treatment. These films possess good adherence and may be used as bases for subsequent electroplates or paints.

In the acid bath process, the work is immersed for 20 to 60 min in a dilute nitric acid solution containing about 0.5 pct of heavy metal salts, such as zinc, chromium, nickel, cobalt or copper. This produces an aluminum oxide film in which particles of the heavy metal used are embedded. Alkali chromates may be used to increase the oxidation effect.

The neutral or acid bath process employs immersion of the work in a cold bath for 10 to 15 min. The solution used contains about 5 pct permanganate plus 2 pct hydrofluoric, sulfuric or acetic acid with about 5 pct sodium chromate and 0.5 pct of a heavy metal salt. The oxide film formed is composed of manganese dioxide, chromic oxide and aluminum oxide. The color of the film is dependent on the amounts of the compounds and the kind of heavy metal used. Instead of the acid, 1.2 pct hydrogen peroxide and 2 pct sodium dichromate may be employed.

The hot alkaline baths used for this process are composed of about 5 pct sodium or potassium carbonates or hydrocarbonates plus 1 pct of a heavy metal salt. The dark oxide film formed may be brightened by the addition of 5 pct potassium dichromate or glycerine to give a metallic luster.

PROTAL PROCESS—This process consists of immersing aluminum for about 40 min in a boiling solution of 0.5 pct of alkali manganate, molybdate or vanadate and 1 pct of sodium hydroxide or carbonate. This alkaline solution produces metallic compounds which form two oxides, a higher one which is soluble in alkali and a lower insoluble one. This occurs under the reducing action of hydrogen liberated at the aluminum, and the lower oxide is deposited in the aluminum oxide film forming protective oxide film on the metal. An addition of alkali phosphate to the bath causes settling out of the disturbing aluminum hydroxide as aluminum phosphate.

PACZ PROCESS—The treatment of aluminum in a hot (160° to 212°F) solution of about 0.15 pct of sodium fluosilicate, sodium oxalate or sodium fluozirconate, 0.25 pct nickel or cobalt salts and 0.3 pct of sodium or ammonium nitrate, produces a protective, colored and abrasion resistant film. The variation in color tone in certain areas results from the weak etching action of the sodium fluosilicate, etc., which dissolves aluminum while darker areas result from the aluminum alloy constituents, such as iron or silicon, which are not attacked.

McCULLOCH PROCESS—A white protective film is formed on commercially pure aluminum, or a green-

ish-white film is formed on aluminum alloys, by immersion in a hot (160° to 212°F) solution of 1 pct calcium hydroxide and 1 pct calcium sulfate for 1 hr. The calcium sulfate is used to reduce the alkalinity of the bath. Corresponding strontium compounds produce films equally as good. After treatment in this solution, until the active evolution of hydrogen subsides, the metal is washed and heated to about 390°F. This evaporates the water present in the film which is composed of calcium and aluminum sulfate and aluminum oxide, and increases its electrical resistance. If aluminum is treated in a hot bath of 0.5 pct barium oxide and 0.5 pct barium sulfate, uniform silvery-gray, adherent and protective films are formed on aluminum.

ZINCATE COATING—Aluminum and its alloys may be coated with zinc by immersing the parts in a zincate bath maintained at room temperature. This treatment results in a very thin, firmly adherent coating of zinc on aluminum which may be used as a base for subsequent electroplates. The method recommended consists of:

(1) Solvent vapor degreasing.
(2) Immersion in a mild alkaline cleaning solution at 160° to 180°F for about 5 min.
(3) Rinse in hot water.
(4) Dip in a 5 pct caustic soda solution maintained at 150°F for 1 min.
(5) Rinse in cold water.
(6) Immersion of the parts in the zinc coating solution for 2 to 3 min. The zinc coating solution consists of 525 g of caustic soda and 100 g of zinc oxide to one liter of water.
(7) Rinse thoroughly in cold water.

BONDERIZING—Bonderizing on aluminum is a patented process developed by Parker Rust-Proof Co., Detroit. This method involves the treatment of aluminum or its alloys as follows:

(1) Clean the work thoroughly by immersion in a mild inhibited alkali cleaner, by solvent or immersion cleaning, or by vapor degreasing.
(2) Immerse the cleaned metal in the Bonderizing solution, maintained at a temperature of about 160°F, for 2 to 4 min. This converts the metal surface to a uniform phosphate coating. This processing solution is prepared by dissolving 10 g of boric acid and 12.5 g of sodium bifluoride in one liter of water. Then 109 g of Bonderize make-up solution is added slowly with constant stirring.
(3) Rinse thoroughly in cold water for about 30 sec immediately after Bonderizing.
(4) Immediately after the water rinse, the work is rinsed for about 30 sec in a dilute solution (0.6 g per liter) of chromic acid maintained at a temperature of about 180°F.
(5) Dry the parts thoroughly prior to painting.

This coating appreciably aids paint anchorage and tends to prevent paint film failure.

CHROMATIZING—This treatment forms a very thin, inert aluminum oxide film on the metal surface which tends to promote paint adhesion. The coating is intended essentially as a paint base and, when used as such, it provides excellent corrosion resistance even when painted surfaces are abraded to the base metal. It also aids paint anchorage appreciably and tends to prevent paint film failure. This chemical treatment is given aluminum and its alloys by immersion in a 5 to 10 pct solution of chromic acid maintained at a temperature of 140° to 150°F. The work is left in the solution for about 5 min, after which it is rinsed in cold water and dried.

PHOSPHATIZING—This treatment is similar to chromatizing in that it forms a thin, inert phosphate coating on the metal. The chemical treatment is accomplished by immersing the work in a 5 to 10 pct solution of phosphoric acid (75 pct) maintained at room temperature. The aluminum parts are left in the solution for about 5 min, after which they are rinsed in cold water and dried. Both chromatizing and phosphatizing are used after mild alkaline cleaning to neutralize any alkali remaining on the aluminum surfaces and to prepare the surfaces for painting. Painting should be done as soon after these treatments as possible to avoid contamination of the metal.

ALKALI ARSENIC STAINING—The following process may be used for producing a black color on aluminum. The process involves the immersion of aluminum and its alloys in a solution of sodium chloride. After this, the work is immersed in a bath of arsenous oxide, hydrochloric acid and ferrous sulfate. In the first bath, the aluminum is colored dark by the silicon and iron impurities remaining on the surface of the metal. Then, in the second bath, the precipitated arsenic causes a deep black color.

There is an appreciable difference between the chemical and electrolytic (or anodic) treatments on aluminum and its alloys. In the latter processes, oxidation takes place only on the surface of the aluminum being anodized, but in the former treatments, both oxidation and reduction take place as the oxide film is formed on the metal surface. This means that the bath used must be capable of attacking the aluminum, while at the same time forming the aluminum oxide on the metal.

This series of articles is based on a book on aluminum finishes to be published shortly by Reynolds Metals, Inc., Louisville.

BECAUSE of its corrosion resistant properties, aluminum is used for these frozen food lockers. Front surfaces may be given a satin finish by a light etch, then lacquered to prevent finger marking.

Hot-Blast Cupola Design

A review of the design features of some 11 types of European and American hot-blast cupola systems is presented in this article, together with a description of a unit proposed by the author. Operating characteristics of these designs are also considered briefly. This article is an abstract of a paper presented at the 43rd annual meeting of the Institute of British Foundrymen.

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By E. LONGDEN
G. R. Jackson & Co., Ltd., Manchester, England

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IT would appear that the benefits of applying preheated air to the cupola melting of metal should be indisputable. Yet, the economics of providing preheated air for an intermittent melting furnace need to be examined. Unless the volume of metal to be melted during any day's blow is very substantial most of the best-known hot-blast cupola systems may prove uneconomical. The value of a more precise control over the quality of the metal would in many otherwise border-line cases be sufficient to declare in favor of installing a hot-blast system.

Generally, the efforts of the designers of hot-blast cupolas have been directed to utilizing a portion of the potential heat units obtained from burning the incompletely burned gases collected from certain defined zones of the cupola and also from the sensible heat of the gases transmitted by radiation to tubes or refractory brick passages through which, or around which, the combustion air must pass. It will, however, be shown that there are at least two departures from the methods usually employed embodied in the cupola designed by the author shown in fig. 9 and by the Whiting Corp. of the U. S. illustrated in fig. 11.

The increased efficiency obtained by the delivery of additional Btu's to the combustion zone through the agency of heated air is of a higher order than would be expected from the reduction in the fuel used. This can be attributed to the greater intensity of combustion and brilliancy creating a higher temperature which favors a more rapid chemical reaction of the gases. The increased concentration of heat in the melting zone is obtained with a reduced consumption of coke and air input. The amount of slag to be melted is also reduced. In such furnaces the reduced volume of gases formed will also carry off less heat in the escaping gases. In this connection it is of interest to point out that the normal air input to a cupola is nearly equal in weight to that of the metal melted.

Cameron Warm-Air Cupola

The simplest method of preheating the blast is conceived in the system adopted by John Cameron, a

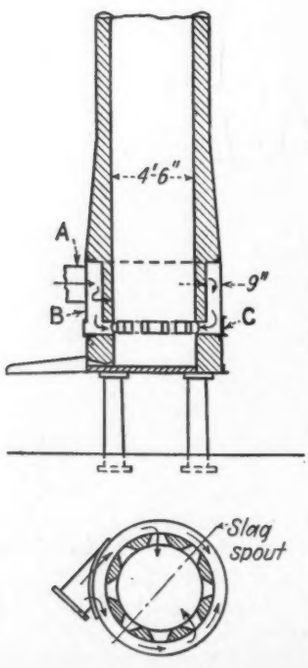

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FIG. 1—Cameron hot-blast cupola:—A, cold air blast pipe from blower; B, air belt surrounding combustion and melting zone; C, tuyeres.

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past-president of the Institute of British Foundymen, and shown in fig. 1. It will be noted that the air belt is built into the lower section of the lining. Its depth extends to cover the preheating and melting zones. Because of the intervening thin lining heat is transmitted to the air circling it before passing through the tuyeres, thus warning the air for combustion. Cameron reports that the results justified the adoption of the lining wind belt air heater.

Schuerrmann Hot-Blast Cupola

Fig. 2 illustrates the Schuerrmann (German) hot-blast cupola. It is designed on the regenerator principle. The air for combustion first enters through the reversing valve, A, passes through the chamber, B, of the preheater, enters the cupola at C and into combustion with the carbon of the coke. A portion of the gases of combustion now pass through to the chamber, E, thereby heating it, then through the reversing valve, A, and the throttle valve, F, to the outlet chimney, G.

A portion of the blast is by-passed to flow through two tuyeres, D, to further a more complete burning of the incompletely-burned gases passing from the cupola into the intermediate chamber, M, then on through the preheater area, E. The valve, A, is reversed at about 8-min. intervals thus allowing the chamber to be heated. The tuyere area is much greater than in normal cupola practice.

The efficiencies claimed are: Coke consumption of 7 to 9 pct; effluent gas temperature leaving the stack of the cupola, 212° to 302°F, is given to prove that the brickwork of the heating chambers was absorbing a large percentage of the heat of the gases; gases leaving the stack contain about 13 pct. CO_2 and 5 pct CO; reversals prevent slagging of tuyeres; and sulphur reduced by 30 pct.

Frauenknecht Hot-Blast Cupola

The Frauenknecht (German) system is illustrated by the general arrangement sketch, fig. 3, which shows the arrangement of the heater pipes. The designer of this cupola describes the system as follows: If a cupola works inefficiently, losses of iron occur due to excessive oxidation. The iron may be oxidized to its oxide in the form of gas, or to iron oxide as a component of the slag. In order to obtain improved melting conditions only reducing gases must rise in the cupola. Hot gases of combustion are led off just above the melting zone through outlets in the lining of the cupola into vertical cast-iron ducts. After giving up heat to the vertical pipes the gases pass again into the cupola at a point above the preheating zone proper. The air required for combustion enters a blast belt just below the charging door. From this belt pipes which jacket the hot-gas ducts are suspended, the lower ends entering a second blast belt from which air passes to the tuyeres and into the combustion zone of the cupola. It appears that the principal advantages of the system are that iron losses are cut to one half of normal and a higher quality metal is obtained.

Zoller Hot-Blast Cupola

About 1938, Zoller (German) put forward a new melting process which is, in its final aspects, a hot-blast cupola. The sketches X, Y and Z in fig. 4 illustrate the furnace design. The most unusual feature

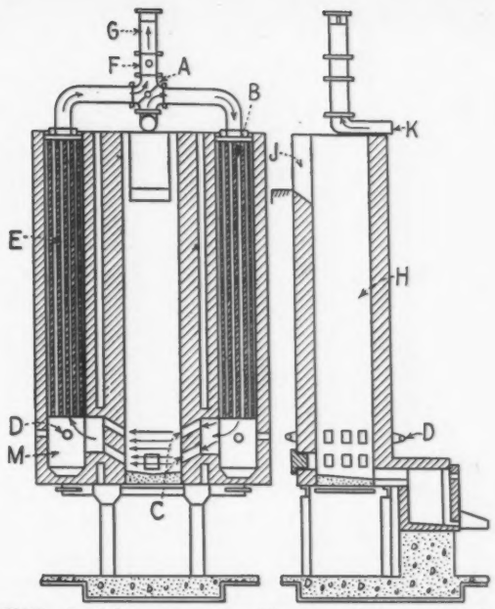


FIG. 2—Schuerrmann hot-blast cupola:—H, cupola shaft; J, charging door; K, cold air from blower; A, reversing valve; B, preheater; E, preheater; C, main tuyeres; D, small secondary air boosting tuyeres to chamber; M, distributing and secondary combustion chamber; F, throttle valve; G, outlet chimney.

of the Zoller cupola is that there is only one charge of metal present in the cupola throughout the melting period. This single charge of metal is, however, much larger and heavier than with standard cupola practice. The cold metal charge is placed on a coke bed which has been previously combusted to a high incandescent temperature. A covering charge of coke is then placed above the metal charge.

If it is, as stated, then surely this favors a tremendous waste of heat, especially during the preliminary boosting of the coke bed to a high temperature. Zoller explains that a special arrangement utilizes the escaping heat. In favorable cases, he states, the loss of heat is no greater than in normal melting

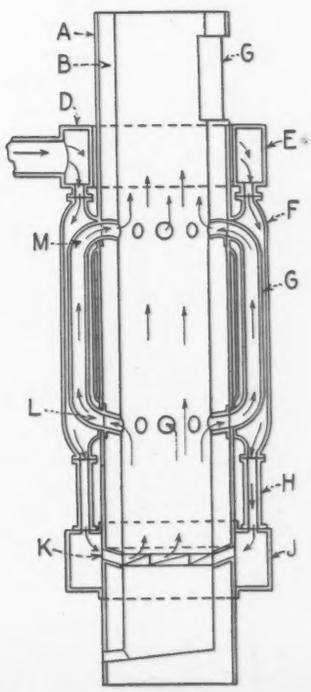


FIG. 3 — Frauenknecht hot-blast cupola:—A, cupola shell; B, brick lining; C, charging door; D, cold blast main from blower; E, cold air belt; F, air heating vertical down-tubes; G, hot gas tubes; H, heated air lead pipes; J, heated air belt; K, tuyeres for heated combustion air; L, outlet tuyeres for hot gases; M, inlet tuyeres for cooled gases.

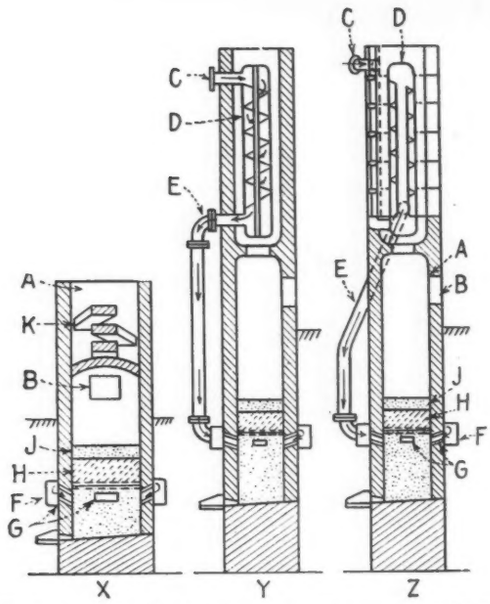


FIG. 4—Zoller hot-blast cupola:—A, cupola shaft; B, charging door; C, cold air supply pipe; D, preheater; E, down-pipe sections for preheated air; F, air belt; G, tuyeres; H, metallic charge; J, covering coke; K, reflecting leaves.

practice where heat is lost due to the reactions which take place in the cupola.

The sketch X (fig. 4) shows at K the provision of so-termed "reflection leaves" located above the charging door, B, thus radiation returns a portion of the escaping heat units to melt and increase the temperature of the metallic charge. At the same time gases have a free exit.

Fig. 4 illustrates in sketches Y and Z a modified reflector in the general formation of the cupola just above the charging door, B, and the more important additions of blast heaters in the stack of the cupola. It will be noted that the heaters are so designed to take up a large portion of the area in the chimney part of the cupola. Cold air from the blower enters through the blast pipe, C, then through the heater pipes, D, the air then passes through the down-lead pipes, E, wind belt, F, and into the combustion zone of the cupola through tuyeres, G.

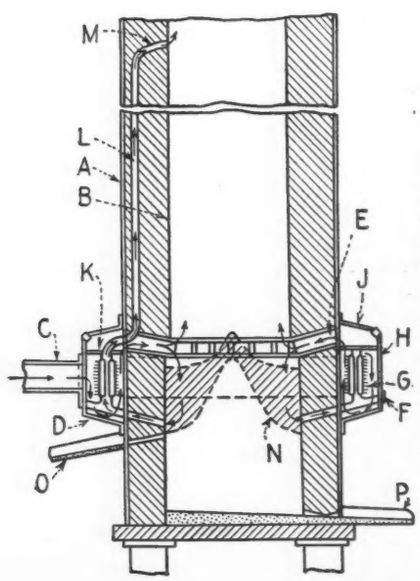


FIG. 5 — German hot-blast cupola:—A, cupola shell; B, inside lining face; C, cold air blast pipe; D, air belt; E, tuyeres for warmed air; F, outlet holes for preheating gases; G, internal preheater belt; H, preheating chamber; J, warmed air section to feed the tuyeres, E; K, deflector and dividing plate; L, exhaust gas outlet; M, exhaust gas inlet to cupola shaft; N, zone affected by withdrawal of gas from below tuyeres; O, slag spout; P, tapping spout.

The advantages claimed are:

(1) Escaping heat units are utilized to preheat the air for combustion; (2) minimum metallurgical changes because the metal is melted very rapidly, sulphur pick-up is much reduced, higher sulphur content fuel may be used; (3) since there is a constant and uniform supply of coke in the furnace, the fuel can be combusted with a balanced amount of air without too much excess, thus burning reaches its highest value of CO_2; (4) gases of combustion do not come into contact with further metal and coke, thus, metal is little affected further, and the carbon dioxide cannot be dissolved back to carbon monoxide; (5) because the metal charges are melted separately it is possible to interrupt or delay the melting process and, differing qualities of metal can be safely dealt with; (6) one layer of coke carries only one layer of metal, thus coke of inferior quality or strength can be used.

Anonymous German Hot-Blast Duplex System

A cupola furnace design combining the cupola and air furnace hearth has been developed. On melting in the cupola shaft the metal flows into the lower hearth part of the dual furnace, where the metal is further superheated by introducing and burning pulverized fuel, gas or oil. The gases generated in the hearth can be employed to preheat the blast or increase the melting temperature in the cupola into which they pass.

Fig. 5 shows a German cupola designed to preheat the blast by withdrawing heated gases from what is termed the dead zone below the tuyeres, (the author cannot agree that this zone is dead if gases are withdrawn, since such withdrawal will encourage the passage of air to create an extended combustion zone below the tuyeres.) It will be noted that outlets, F, allow a passage of the gases of combustion from below the tuyeres, E, into the internal hot gas belt, G, thence through the outlet vent, M, to a point well up in the stack of the cupola. Cold air enters the wind belt, J, from the blast main, C. The air is influenced to circulate and impinge on the internal heater belt, G, by the deflector ring, K. The flow of the air is indicated by the direction arrows. Performance data are not available.

Olivo Hot-Blast Cupola

The Olivo (Italian) air preheating system endeavors to utilize the hot gases escaping from the slag hole to heat the air for combustion. There is little clear information available as to the actual construction of the cupola, but the sketch (fig. 6) will serve to explain the design. Gases flowing out of the slag hole, G, pass into the slag trough, H, above which is located a hood, J, through the vertical gas leads, L, into the heaters, F. The passage of the gases is induced by an exhauster at some convenient point of the cupola system. Cold air passes into the belts, K, where it is warmed by contact, with the heaters, F, then into the air belts, D, and through the tuyeres on the centres, E.E. Apart from the general claims of the designer no data are put forward in support of this system.

Moore Hot-Blast Cupola

The Moore hot-blast cupola system developed by Mackenzie, the well-known American metallurgist, (American Cast Iron Pipe Co.) is illustrated in fig. 7. The particulars given relate to a cupola of 72 in.

lining dia. It will be noted that the air for combustion is heated by passing it through a series of cast-iron pipes, forming the lining of the preheating zone of the cupola. Air for combustion first enters the wind belt, I, passes upwards through the lead-pipe, 2, to the cast-iron 1¾-in, section heater pipes, 3, through the down-lead pipes, 4, to the balancing area belt, 5, then to the down-lead pipes, 6, and tuyeres, 7, into the combustion zone of the cupola. The success of the cupola in due course, after very careful trials and modifications, is proved by the conversion of a number of cupolas to the system at the works of the American Cast Iron Pipe Co. These cupolas have been in operation since about 1927.

Dr. Mackenzie has furnished the author with recent tests he has carried out in which a comparison is made between the hot-blast and cold-blastcupola. These tests are very full, and data are supplied of all the operational details, which would justify publication in full on some future occasion. Briefly the outstanding points are: It was found necessary to replace the hot-blast equipment in cupola No. 5. Until the new equipment could be made it was decided to operate the cupola on cold blast in order to obtain further additional information on hot blast versus cold-blast operation. On opening up the cupola on cold blast, the first four heats were carefully checked. Accurate data were kept on all materials charged into the cupola and the metal melted. At the same time similar information was taken on the hot-blast units. A study of the data sheets reveals the following information:

(*a*) The iron charged into the cupolas during this study averaged 280 tons per 9-hr shift for the cold blast, and 266 tons for two 9-hr and one 8-hr shifts in the hot blast.

(*b*) The cold blast required 14.50 pct more blast to melt 2.15 pct more iron in the same length of time.

(*c*) The silicon loss averaged 2 pct more in the cold blast, or two points up.

(*d*) The average iron loss (wasted loss and charged to iron) per heat was 3096 lb for the cold blast and 2474 lb for the hot blast. This represents 1.9 lb per ton greater loss for the cold blast.

(*e*) The cold blast required 38 lb more pitch coke and 11 lb less regular coke per ton.

(*f*) The refractory consumption was 0.54, 9 in. equivalents more in the cold blast.

(*g*) The iron temperature averaged 2550°F for the cold-blast heats and 2615°F for the hot-blast heats.

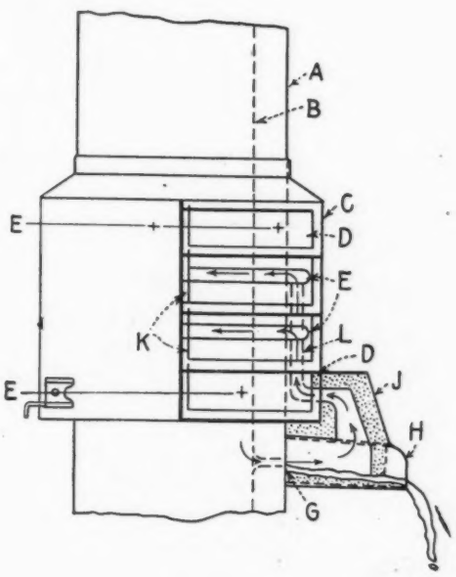
(*h*) Another factor to be considered is the life of the cupola blocks used in lining the cupolas. A conservative estimate is that in the hot-blast cupola the lining life is at least twice that in a cold-blast cupola.

Griffin Hot-Blast Cupola

The best-known hot-blast cupola is illustrated in fig. 8. The hot-blast system has been most carefully and scientifically worked out by V. K. Vial. It will be noted from fig. 8 that a hot gas duct is located at a point above the preheating zone through which between 40 to 50 pct of the ascending gases are conducted aided by an exhauster fan at the final stage of the system. The gases, which contain a percentage of incompletely burnt carbon monoxide, pass down a vertical lead-duct to a combustion chamber where most of the carbon monoxide is burned to carbon dioxide. The revived gases with the increased Btu's then pass through a large number of vertical iron tubes located in a chamber above the combustion box. A large amount of heat is absorbed by the tubes before the gases flow to the exhauster. Air is passed into the heated tube chamber and then through the warm-blast pipe to the air belt and tuyeres into the combustion zone of the cupola. The temperatures recorded at various points of the system are indicated in the sketch, fig. 8.

The work of Vial reveals the additional studies from which certain principles have been well established in respect to the theory of heat transfer for preheating air as follows: (1) The laws regarding the transfer of heat through the walls of metal tubes; and (2) the amount of air to be heated, and the amount of gases available for furnishing the heat, are variables through a wide range.

The amount of coke per ton of iron melted may



LEFT

FIG. 6—Olivo hot-blast cupola:—A, cupola shell; B, inside lining face; C, air belts; D, heated air section to feed tuyeres; E, center line of tuyeres; F, preheater chambers; G, slag hole; H, slag spout; J, slag spout hood; K, air preheating belts.

o o o

RIGHT

FIG. 7—Moore hot-blast cupola—vertical part cross-section of cupola:—1, bustle pipe which receives cold air from the blower; 2, vertical riser and elbow pipe; 3, series of cast iron pipes, 1¾ in. section surrounding and forming a hollow cast iron lining in the preheating zone; 4, elbow and lead pipe; 5, distributor pipe encircling cupola; 6, lead tube; 7, tuyere.

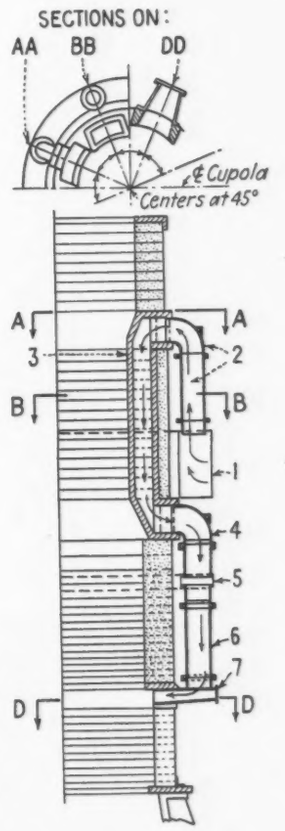


TABLE I

Summary of a Test on Cupolas

	Cold Blast	Hot Blast
Internal lining dram—tuyere zone	40 in.	40 in.
Internal lining dram—melting zone	44 in.	44 in.
Cold air pressure	17 in. W.G.	....
Hot air pressure	....	16.6 in. W.G.
Hot gas pressure	....	17.2 in. W.G.
Bed coke	17 cwt	15¾ cwt
Metal charge	17 cwt	17 cwt
Coke charge	200 lb	110 lb
Generator fuel (gas coke), per charge of metal	....	90 lb
Limestone per charge	56 lb	40 lb
Total metal melted	28 tons	28 tons
Fuel to metal ratio excluding bed	1 to 9.8	1 to 9.8
Fuel to metal ratio including bed	1 to 7.5	1 to 7.68
Hourly melting rate	6.4 tons	7.5 tons
Metal loss	5.2 pct	3.92 pct

vary from 130 to 200 lb, and the amount of air required for the combustion of 1 lb of coke varies from 7.5 to 8.5 lbs, depending upon the efficiency of combustion.

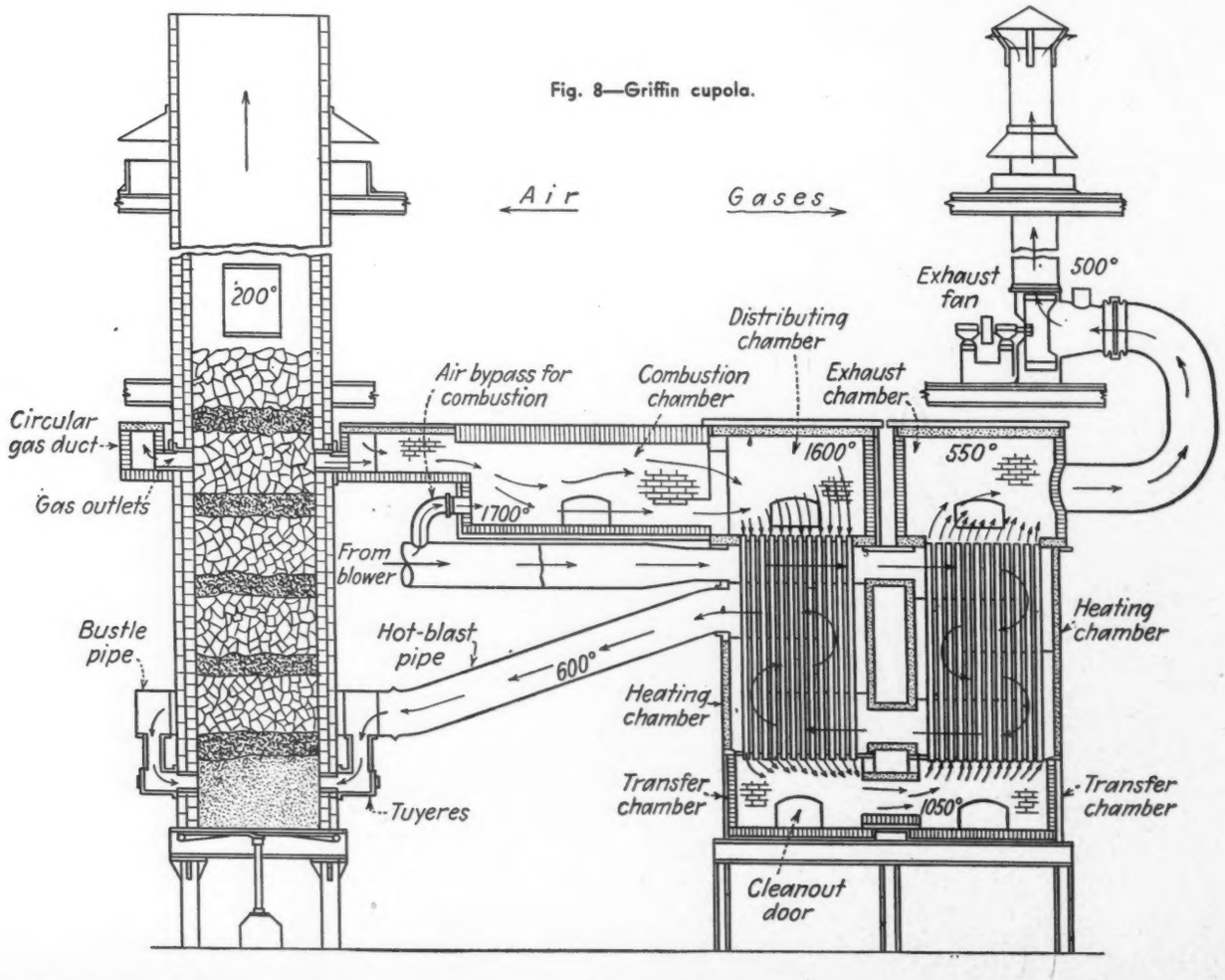
The amount of coke required to melt a ton of iron is indicated in a monthly statement of all Griffin cupolas which show an average consumption of 150 lb. exclusive of bed coke. The Association of Manufacturers of Chilled Car Wheels recently issued a statement showing the performance of 18 cold-blast cupolas in which the average amount of coke required for melting a ton of iron was 216 lb, the range being from 200 to 248 lb the average difference between the two processes—hot or cold—is 66 lb per ton of iron melted. The annual output exceeds 1,000,000 tons of iron melted. The cold blast therefore uses 44 pct more coke than the hot blast. This is not a theory, but the result of large-scale production. It is also reported that there is an increase of 20 pct in the melting rate where hot blast is used.

Longden Hot-Blast Cupola

Generally, the publicized hot-blast cupola systems are based on the use of heated air through the agency of the normally high temperature and incompletely burned gases escaping to the stack and slag hole, or by utilizing the heat units absorbed by the lining of the cupola. The new system to be outlined here is based on supplying the combustion zone of the cupola separately with incompletely burned gases, consisting mainly of carbon monoxide, and with preheated air, the hot gases being produced in an independent generator outside the cupola, and the air being preheated by the hot gases from the generator without being mixed or brought into actual contact with gases until the combustion zone of the cupola is reached. Fig. 9 illustrates the hot-blast system. The tests were made on a cupola of 40-in. tuyere zone lining diam, and a 44-in. melting zone diam.

The general arrangement of the cupola is shown in fig. 9. Cold air is delivered from a blower to the blast pipe, B. The air is apportioned in the header box, G, to provide air for the generator, D, and air for the cupola, P. The amount of air to the generator and cupola is precisely controlled and balanced by a single manipulation of the air-apportioning valve, H. Approximately 30 pct of the air

Fig. 8—Griffin cupola.



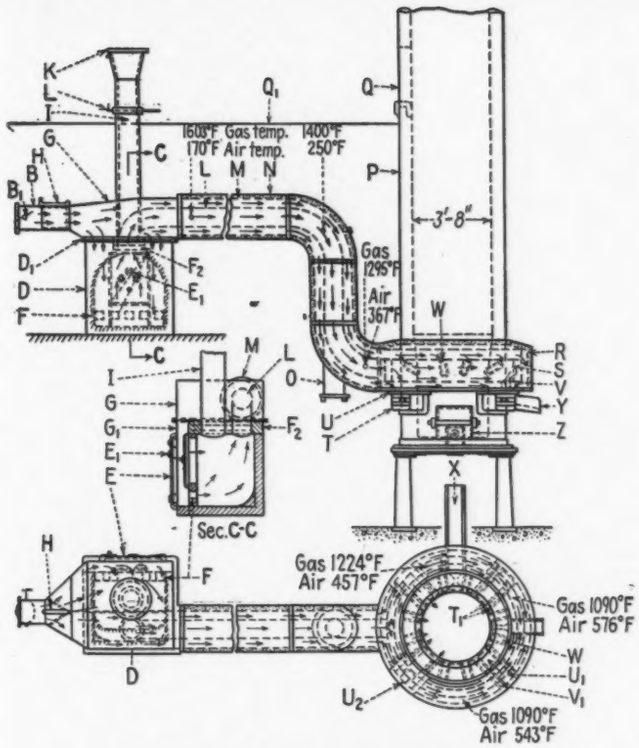


FIG. 9—Longden hot-blast cupola:—B, fan blast pipe connection; B1, fan outlet main valve; D, primary combustion fire box; D1, bolted joint; E, fire box double door; E1, sight and trimming hole; F, fire box air tuyeres; F2, air cooling passage; G, fire box air distribution head; G1, air passage between doors; H, air apportioning valve; I, fuel feeder; J, fuel feeder valve; K, fuel feeder lid; L, combustion gas main supply pipe; M, heated air main supply pipe; N, insulation material; O, dust trap; P, cupola; Q, charging door; Q1, charging platform; R, distribution belt for heated air; S, internal distribution belt for combustion gas; T, double tuyeres for heated air and combustion gas; T1, inner replaceable double tuyere; U, connection to outer tuyere for combustion gas; U1, combustion gas tuyere; U2, cupola combustion zone sight hole through U1; V, entrance for heated air to tuyere section V1; V1, heated air tuyere section of double tuyere, T; W, upper tuyeres for heated air; X, liquid metal outlet spout; Y, slag spout; Z, cleaning door.

is allowed to pass through the deep bed of fuel in the generator. The products of combustion then pass along the internal gas main, L, into the internal gas belt, S, and into the combustion zone of the cupola through the section, U, of the double tuyeres T. The remainder of the air required for combustion in the cupola passes across the generator header, G, to the external air-blast delivery jacket pipe, M, into the external air belt, R, and thence through the air section, V, of the double tuyeres, T, and the single tuyeres, W, into the combustion zone of the cupola.

A number of tests were conducted to ascertain the value of this new hot-blast system. Because of war conditions, however, the tests were incomplete since they did not, for instance, include either gas or slag analysis. They were, however, of a very encouraging character. One of two 6- to 7-ton cupolas of identical construction and air input capacity was altered to accommodate the additional attachments of the new system. Thus the performance of the two cupolas, one operating with cold blast and the other with hot blast, could be readily compared. The results of the most reliable test taken, with all materials charged into and consumed by the cupolas, as carefully weighed and checked as possible, is summarized in Table I.

The coke to metal ratios cannot be said to be any improvement on normal practice; they are, however, comparative. During the periods of tests the fuel supplies were inferior, and the first consideration was to melt metal at the best temperature to produce a suitably sound casting. The general advantages of the hot-blast system may be stated as:

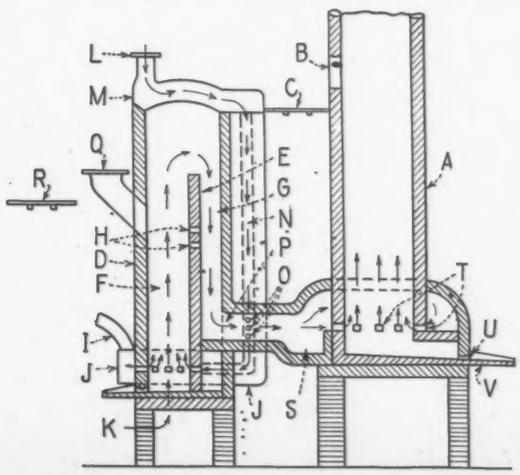
(1) Hot air is obtained immediately the cupola is put under blast; (2) improved control over the properties of the metal; (3) economy in fuel consumption; (4) brighter tuyere combustion zone; (5) reduced consumption of limestone; (6) lowered consumption of lining refractories; (7) increased rate of melting; (8) extended melting period; (9) reduced loss of iron; and (10) improvement in tapping temperatures.

Improved control of the metal can be expected since there is less fuel burned in direct contact with the metal. This will allow of a low carbon pick-up when melting steel-mix metals of the high-duty quality and, also, there is a lower sulphur absorption. There is distinct evidence of a reduced iron, silicon and manganese loss.

Fuel economy results from the burning of cheap low-grade fuel in the generator fire box, and the increased temperature, brilliance, and consequently quickened chemical activity, in the combustion zone of the cupola due to the introduction of heated combustion air, and high-temperature gases from the generator. The increased turbulence, and from it the more perfect mixing of the gases at an early stage, will increase the efficiency of combustion. There is also a reduction in the flux used for which less fuel will be needed to fuse it.

The tuyeres remain bright and clean over longer periods, when compared with the cold-blast systems, because the chilling influence of the hot air on the formation of the slag bridge above the tuyeres is

FIG. 10—Dyer hot-blast cupola:—A, cupola melting shaft; B, charging door; C, charging floor; D, detached generating chamber; E, vertical baffle wall; F, chamber for burning fuel; G, passage for gases forced by mechanical pressure; H, openings for gases to passage, G; I, air from positive blower; J, wind box partially encircling chamber, F; K, tuyeres; L, second delivery of air; M, series of pipes which form the dome of chamber, F; N, conduits through which to wind box J, air is heated to 600°F before passing through tuyeres, K, and as they pass to gas main recuperative system, P; O, air jets for free air from conduits, N, to create the maximum of carbon dioxide; P, gas main; Q, fuel charger; R, charging floor; S, gas belt surrounding cupola; T, gas ports; U, tap hole; V, tapping trough.



very considerably reduced. This improvement also extends the possible length of time the cupola can be used during any single heat. The pressure of the blast allows slag to be retained on the slag bridge, thus a more prolonged and more concentrated chemical attack on the lining. Any retardation and reduction of the slag bridge formation will, therefore, reduce lining wear.

The temperature of the gases and air throughout the system, before entering the combustion zone of the cupola, is indicated in fig. 9. It will be noted that the temperature of the air increases fairly rapidly in direct ratio to the length of the path it travels, and the gases of combustion fall in temperature in direct ratio to the length of the path traversed. From these observations it is possible to calculate the length of air blast and gas main needed to establish approaching equal temperatures between the heated air and cooled gases of combustion before entering the cupola.

Such a design as the one outlined can be justified for the great majority of medium and small cupolas melting comparatively small quantities of metal over blowing periods of up to 4 hr, as the benefits of heated air are obtained immediately the cupola is put under blast.

The new system should have a special application to the production of cupola-melted metal to the necessarily close limits required for both whiteheart and blackheart malleable iron, high-silicon acid-resisting iron, high duty irons, and even certain classes of nonferrous metals.

Dyer Hot-Blast Cupola

It was not until the usual search was made by the patent office, after the filing of the application of the new hot-blast system, that the author became aware of a previously registered hot-blast cupola, designed to improve the control over the properties of cupola-melted metal by burning a proportion of the fuel in a generator outside the main cupola shaft. Fig. 10 shows an outline of this cupola designed by Dyer, of the United States. No data are available as to the success achieved by this design. The conception would appear to be rather vague.

Whiting Hot-Blast Cupola

The Whiting Corp. (Harvey, Ind.), has recently supplied some particulars of a hot-blast cupola. The air for combustion is preheated through the agency of heat obtained from burning fuel in an external firebox. This cupola is illustrated in fig. 11. It will be noted that cold air passes from a blower, A, into the blast main, B, then enters a series of tubes, C, arranged in a heating chamber, D, from which the air enters the warm-blast main, E, and on to the combustion zone of the cupola, F. The automatic stoker, G, feeds fuel to the external firebox, H, from which the products of combustion pass to the air preheating chamber, D. After giving up heat to the tubes, C, the gases are exhausted through the chimney, J, to the outside atmosphere.

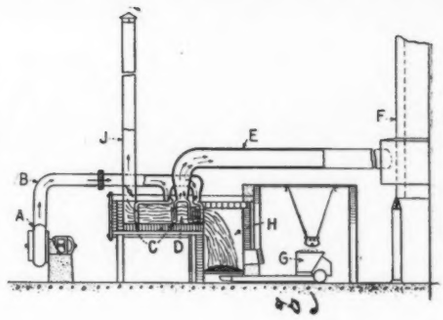


FIG. 11 — The Whiting hot-blast cupola:— A, blower; B, air blast main; C, heater tubes; D, heating chamber; E, warm-blast main; F, cupola; G, automatic stoker; H, external fire box; J, gas exhauster chimney.

The designers point out the benefits of preheated air in controlling consistency, and the quality of the metal in this warm-air cupola. No performance data are available.

Conclusion

The case for the hot-blast cupola seems well established, in particular by Vial with his Griffin cupola, and McKenzie's Moore cupola. The hot-blast cupolas developed in Germany show a persistent examination of the problem of preheating the air for combustion. A certain measure of preliminary success can be acknowledged in the system of preheating air for cupolas based on the burning of a proportion of the fuel required to melt the metal in a generator outside the main cupola stack. A comparatively wide range of hot-blast cupolas have been outlined in this paper with little contribution from British designers.

New Metal Finishing Process Announced by Sturgis

A NEW mechanical finishing process for small parts, known as Britehoning, has been announced by Sturgis Products Co., Sturgis, Mich. The process is described as an improved mechanical method of processing small stampings, forgings, machined parts, extrusions, die castings and sand castings. It is basically a tumbling method involving the use of mineral chips and compounds for developing semilustrous finish. It is said to be ideally suited for preplating operations on small zinc base die castings and brass stampings prior to bright nickel and chrome plating. Steel and aluminum parts can be finished by the same procedure with satisfactory results.

Parts to be finished can be processed directly after the forming or trimming operation, providing die or stretcher marks are not too deep. Die castings, if closely trimmed, may be processed as received from the trim die but if the trimming is not close, a polishing wheel or abrasive belt operation may be necessary to remove this prior to Britehoning. The process is said to be capable of being operated with semiskilled labor.

Temper Embrittlement of Aircraft Steels

Data are presented in this investigation concerning the effects of tempering temperatures on the impact properties of several aircraft steels. Results of Charpy, Izod and tension impact tests are illustrated by correlated curves which indicate the variation in degree of embrittlement of susceptible steels when tempered in critical temperature ranges. Application of these data to design and process specification are briefly discussed, as is also the need for modification of present specifications which attempt to specify a "universal" minimum tempering temperature.

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IN reviewing the history of service failures occurring in high strength steel parts, particularly those subject to impact or dynamic loading such as aircraft landing gears, it has been shown that a large number of such failures may be directly attributed to an excessively brittle condition in the metal itself. Extensive research by previous investigators has indicated that such brittleness may often arise during tempering treatment of steels, and that it may occur (1) when steels are slowly cooled through a critical temperature range of approximately 1000° to 500°F, (2) when tempering operations are conducted at temperatures in this critical range after quenching from austenitizing temperature, or (3) when reheating in the critical range follows previous tempering at higher temperatures.

While it is to be remembered that these embrittling effects are ascribed directly to essentially the same mechanism of precipitation, the exact nature of which has not to date been completely or satisfactorily explained, the present investigation will be concerned with the second of the above mentioned types.

Materials selected for this study are common aircraft steels widely applied in assemblies where high strength and impact resistance are required. Because of their essential alloying elements (particularly nickel and chromium in combination), these have been found to be among the steels most susceptible to temper embrittlement and therefore are particularly well suited to the illustration of embrittling effects which appear in steels tempered at critical temperatures. It is emphasized that embrittlement caused by tempering treatments over extended periods in critical ranges is not materially minimized by quenching from tempering temperature, or by alloy additions (i.e. molybdenum which partially inhibits embrittlement during slow cooling through brittleness ranges), and these factors then should interfere little with the accurate determination of ranges in which temper embrittlement becomes most pronounced as shown in the present study.

In attempts to produce steel parts whose impact resistance is consistent with high hardness and strength, many methods of evaluating embrittling effects have been proposed. Instances of extreme brittleness have been shown by loss of rupture stress and reduction of area in static tension tests as well as the appearance of fracture faces produced in static tension failure. Metallographic procedures, dilatometric and magnetic analyses as well as electrical measurements, have met with only partial success, and then in scattered cases of severe embrittlement. It has therefore developed that these methods have not in general been found adequate or entirely suitable to measure brittleness effects, and hence both Charpy (simple beam) and Izod (cantilever beam) impact tests have been adopted and established as standards of measurement and evaluation. It is to be noted that these tests indicate quantitatively (by measurement of energy absorption) the resistance of the metal to deformation and fracture under flexural impact loading at a point where a large local concentration of stress occurs because of change in section and notch effect.

In considering the conditions of service to which aircraft parts are subjected, it has been shown that the Charpy and Izod tests satisfactorily simulate some types of loading under which these components may be required to operate. However, other conditions of service have emphasized the need of a test which integrates factors of dynamic tensile stress with those of brittleness, and therefore this study also presents values obtained in tension impact which results are correlated with those of notched bar tests.

Previously much confusion and controversy have attended the establishment of practical minimum tempering temperatures to avoid embrittlement of steels in heat treatment. This has been attributable to fac-

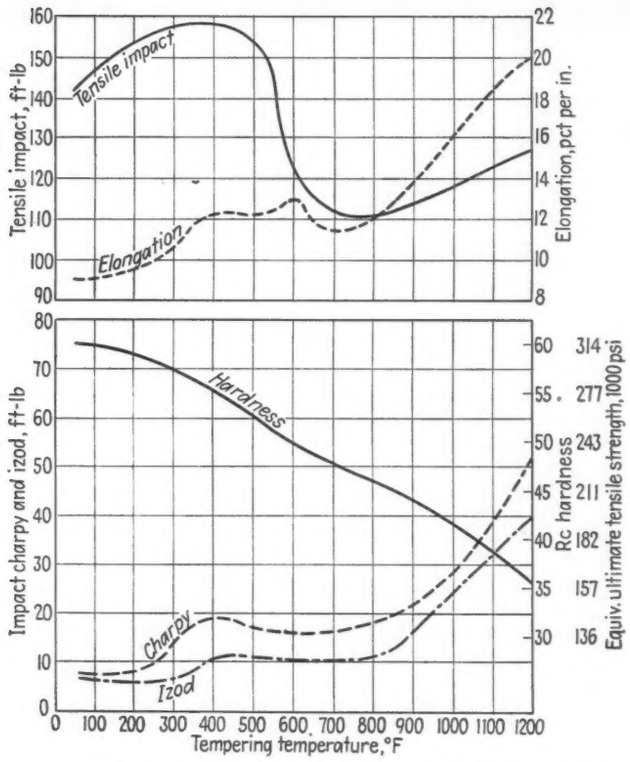


FIG. 1—Effect of tempering temperature on physical properties of SAE 4340 steel. Prior heat treatment; austenitized 1 hr at 1550°F, oil quench, temper ½ hr. Austenitic grain size No. 10.

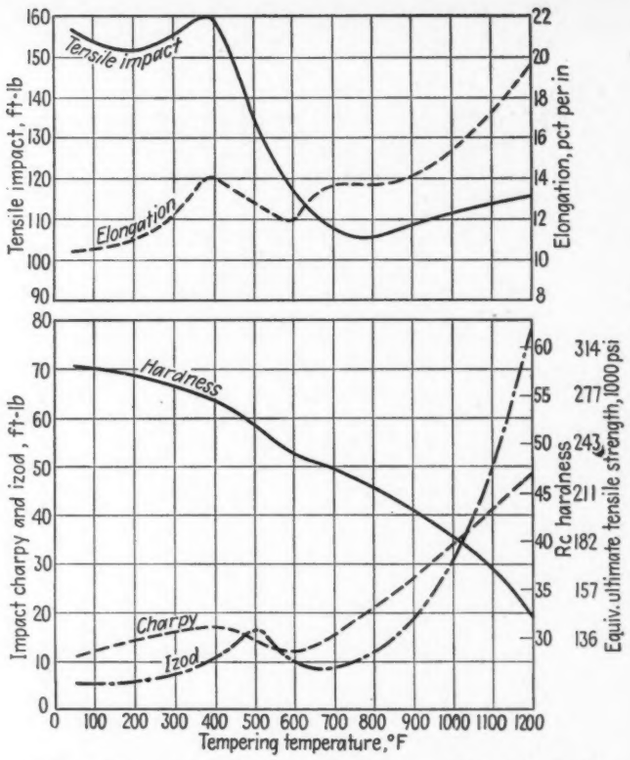


FIG. 2—Effect of tempering temperature on physical properties of SAE 4140 steel. Prior heat treatment; austenitized 1 hr at 1575°F, oil quench, temper ½ hr. Austenitic grain size No. 9.

tors involved in the different methods employed to evaluate impact or dynamic energy absorption, and to the recognized and appreciated difficulties to be met with in designing components for specific impact resistance. Obviously, different testing methods may be expected to yield variations in indicated embrittlement ranges, and therefore the present investigation is directed toward the development of effective minimum tempering temperatures as established by several testing procedures. As such, it may be considered essentially a preliminary step in suggesting methods whereby design and process specification may be more appropriately correlated with impact strength.

Test specimens for the investigation, including type V ASTM tension impact, standard Charpy (keyhole notched bar), and standard Izod (double V notched bar), were rough machined from ⅝-in. diam bar stock of the analyses listed in table I.

Preliminary heat treatment of all specimens before tempering at preselected temperatures consisted of quenching in suitable media after austenitizing for 1 hr at normally employed temperatures for each steel (in the range of 1550° to 1575°F). Austenitic grain size as determined by microscopic examination of sections removed from test bars, was established as ASTM No. 9 to 10 for all steels.

Subsequent to quenching, representative specimens were tempered for a period of ½ hr at temperatures of 200°, 400°, 500°, 600°, 800°, 1000°, and 1200°F. This time of hold in tempering was selected as being adequate to produce the desired results. Rough machined test specimens, water quenched from tempering temperatures, were finish-machined to final dimensions to remove any surface decarburization incurred during previous heat treatment.

Results of impact tests conducted for all steels (as-quenched and as-tempered specimens) shown graphically in figs. 1 through 8, include those of tension impact, elongation as obtained from tension impact specimens, Rockwell "C" hardness and notched bar (Charpy and Izod) tests.

Figs. 1 through 5 illustrate correlated curves for each of the steels studied in this investigation. Figs. 6, 7 and 8 show composite tension impact, Charpy and Izod curves respectively for all materials. The scale of energy absorption has been expanded in figs. 6, 7

TABLE I
Analyses of Subject Steels

	C	Mn	P	S	Si	Cr	Ni	Mo
SAE 4340	0.43	0.67	0.017	0.009	0.28	0.74	1.81	0.21
SAE 4140	0.45	0.80	0.017	0.037	0.30	1.03	0.05	0.19
SAE 4130[1]	0.30	0.53	0.010	0.011	0.26	0.95	0.17	0.17
SAE 4130[2]	0.32	0.55	0.008	0.018	0.26	0.98	0.21	0.25
NE 8630	0.33	0.82	0.012	0.017	0.31	0.58	0.54	0.20

[1] Oil quenched. [2] Water quenched.

TABLE II
Critical Tempering Temperatures for Embrittlement of Aircraft Steels, °F

Steel	Izod	Charpy	Tension Impact
SAE 4340	675°	620°	770°
SAE 4140	665°	590°	790°
NE 8630	680°	675°	830°
SAE 4130[1]	660°	525°	830°
SAE 4130[2]	630°	615°	835°

[1] Oil quenched. [2] Water quenched.

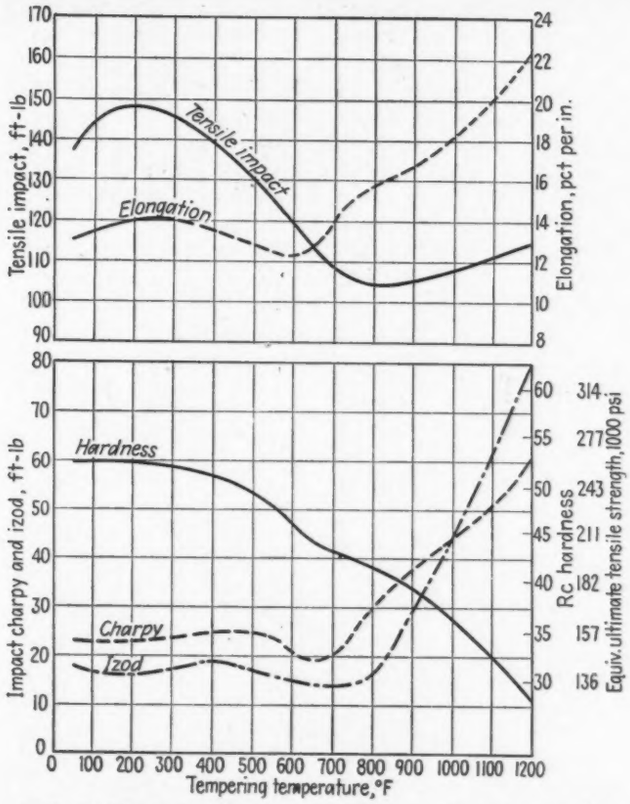


FIG. 3—Effect of tempering temperature on physical properties of NE 8630 steel. Prior heat treatment; austenitized 1 hr at 1550°F, oil quench, temper ½ hr. Austenitic grain size No. 9.

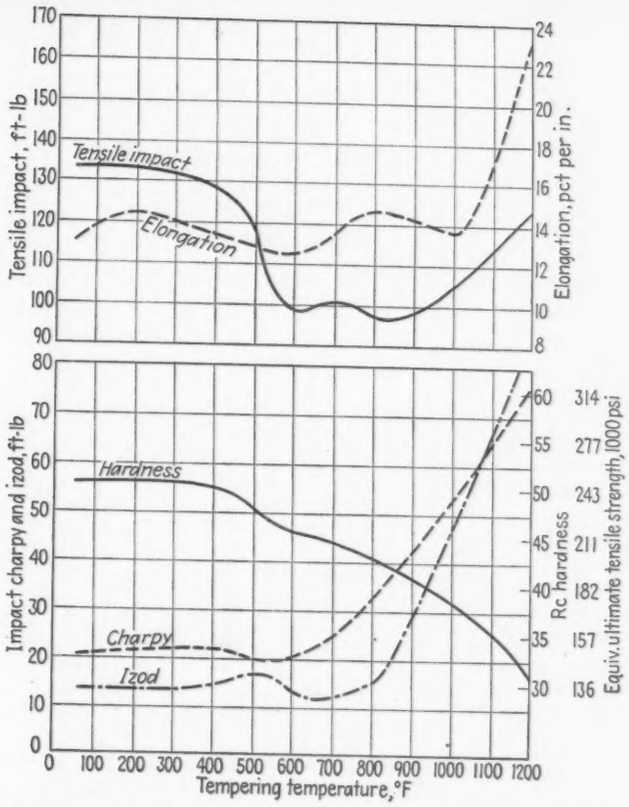


FIG. 4—Effect of tempering temperature on physical properties of SAE 4130 steel. Prior heat treatment; austenitized 1 hr at 1550°F, oil quench, temper ½ hr. Austenitic grain size No. 9.

and 8 to emphasize temperature ranges in which embrittling effects occur.

In considering the results obtained as illustrated in the accompanying data, a marked similarity in the response of the subject steels to tempering treatment is immediately evident. While some irregularities appear in these data, all steels concerned react in much the same manner as shown by impact tests, wherein the greatest losses in impact strength of all materials occur at the approximate tempering temperatures of 525° to 675°F as indicated by Charpy tests, 630° to 680°F by Izod, and 700° to 835°F by tension impact. Specific critical tempering temperatures, i.e. the temperatures at which the most pronounced embrittlement is evident, for each of the subject steels as defined by the three impact tests are shown in table II.

It can be seen that while these temperatures represent points at which minimum test values were obtained, embrittling effects occur over a range of temperatures. These embrittlement ranges (or zones) are defined at low tempering temperature by the temperature at which the initial decrease in impact strength is noted, and at high tempering temperature by the temperature where recovered impact values reach the point at which the original decrease was observed.

Obviously, this definition of embrittlement ranges cannot reasonably be applied to tension impact results inasmuch as these values do not exhibit full recovery at temperatures to 1200°F. The average temperature spread for brittle zones as shown by Charpy and Izod is approximately 300°F, and therefore embrittlement ranges as indicated by tensile impact tests will be defined (arbitrarily) by this spread in tempering temperature, in which range the most severe embrittling effects are noted. Ranges of temper embrittlement as shown by impact tests are listed in table III.

Because of comparatively wide variations in em-

FIG. 5—Effect of tempering temperature on physical properties of SAE 4130 steel. Prior heat treatment; austenitized 1 hr at 1550°F, water quench, temper ½ hr. Austenitic grain size No. 9-10.

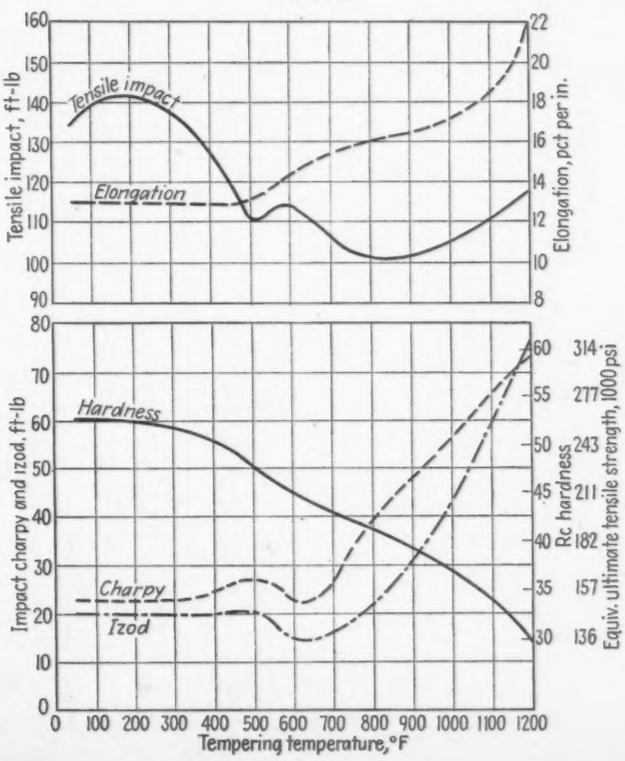


TABLE III
Temper Embrittlement Ranges for Aircraft Steels, °F

Steel	Izod	Charpy	Tension Impact
SAE 4340	430°–785°	405°–830°	660°–960°
SAE 4140	505°–860°	400°–720°	670°–970°
NE 8630	400°–815°	475°–750°	700°–1000°
SAE 4130[1]	505°–815°	350°–640°	590°–890°
SAE 4130[2]	490°–780°	500°–695°	715°–1015°
Average	466°–811°	426°–727°	667°–967°

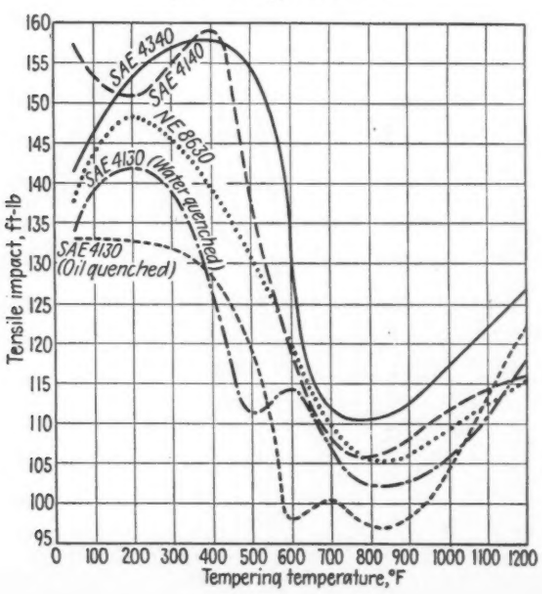
[1] Oil quenched. [2] Water quenched.

brittlement ranges as designated by the different testing methods (and types of loading) employed in the present investigation, it has become increasingly apparent that one specific minimum tempering temperature cannot practically (or intelligently) be established or adopted as a satisfactory criterion of treatment to avoid all embrittling effects in heat treated steel components. It therefore appears that present specifications requiring a "universal" minimum tempering temperature of 650°F (AN Specification) are neither completely justified or warranted, and that adjustment and modification of such specifications are in order. It is to be mentioned, however, that Navy approval of tensile strengths above 200,000 psi are conditional upon a minimum tempering temperature of 850°F.

In comparing the impact properties of subject steels, wide variations in capacity for energy absorption are observed between (1) results of notched bar tests illustrating rather abrupt recovery of impact strength with progressive increase of tempering temperature above approximately 800°F, and increasing values to maxima at highest temperature, and (2) tension impact curves which show the effects of integrated ultimate tensile strength and resistance to dynamically applied stress, with greatest energy absorption shown at relatively low tempering temperature and a more gradual and only partial recovery of values with increasing tempering temperature above 800°F. This, of course, may be ascribed to the appreciably greater effect of lowered ultimate tensile strength with increasing tempering temperature on tension impact values than on notched bar results evaluating resistance to fracture under flexural loading in areas of stress concentration. These observations, in addition to significantly low values of energy absorption shown in notched bar tests by comparison with those shown in tension impact, will obviously merit serious attention in any attempts to employ impact tests as criteria for evaluating materials for applications in which dynamic loading becomes a factor to be considered.

While it is not the purpose of this study to investigate the basic mechanisms by which temper brittleness occurs, or to analyze a large number of data concerned with physical properties other than impact strength as effected by tempering treatments, it is of interest to observe the slight but consistent arrest in the progressive decrease of Rockwell "C" hardness with increasing tempering temperature. Ranges in which brittleness and low elongation are most pronounced are in approximate coincidence with this apparent precipitation effect. This may seem to indicate a more appreciable effect of such precipitation on impact properties than on either elongation or hardness and/or possibly yield and ultimate tensile strength. It may be suggested that future investigations of precipitation hardening phenomena may be assisted materially by the use of impact tests which appear more sensitive to the effects of such hardening.

FIG. 6—Tension impact values of tempered medium alloy steels. Specimens type V, ASTM.



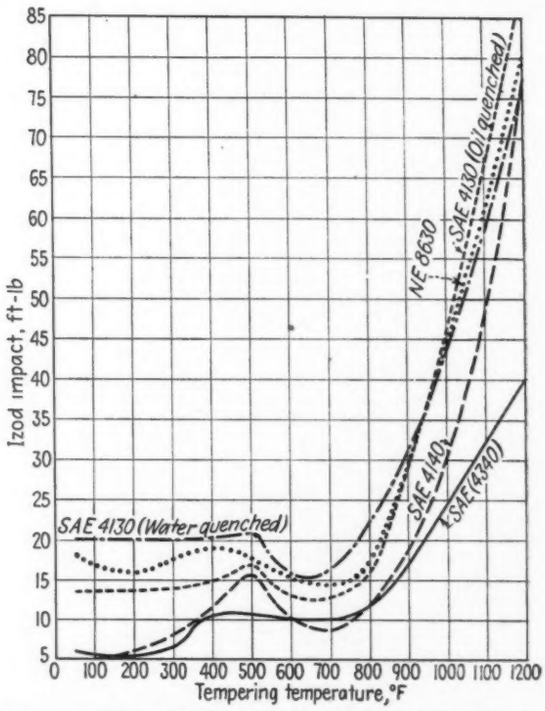


FIG. 7—Izod impact values of tempered medium alloy steels. Specimens V notch, cantilever beam.

Conclusions

Analysis of the results obtained in the present investigation serves to emphasize the importance of avoiding certain critical temperature ranges in the treatment of aircraft steels shown to be particularly susceptible to embrittlement by tempering, and which steels are to be used in highly stressed assemblies subject to conditions of dynamic loading.

The inadequacy of the usual impact tests (Charpy and Izod) in simulating many conditions of service,

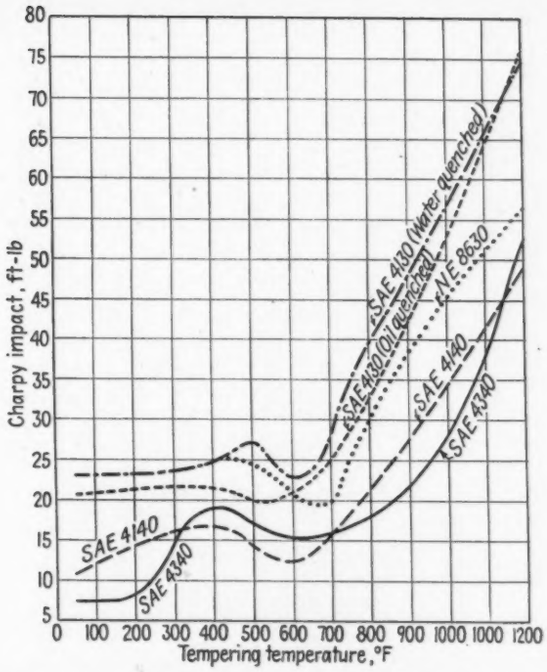


FIG. 8—Charpy impact values of tempered medium alloy steels. Specimens keyhole notch, simple beam.

and therefore in illustrating resistance to impact stress has been indicated, and the need of a test which integrates ultimate tensile stress with factors of brittleness has been demonstrated. Values of energy absorption in tension impact have been correlated with results of notched bar tests, and it is shown that different testing methods will yield widely divergent indications of brittleness ranges.

Inasmuch as there logically exists (directly or indirectly) a definite relationship between the type of stress which characterizes a particular impact test and the conditions of service under which a given component will be required to operate without failure, the design and process specifications for heat treated structural steel members should provide for the avoidance of those brittleness ranges as indicated by the most appropriate test or tests which most closely simulate known or anticipated conditions of stress in service.

It is therefore suggested that specification of valid and practical minimum tempering temperature must be contingent upon the establishment of such temperature as defined by most suitable testing methods.

Although many materials relatively insensitive to the occurrence of temper embrittlement are available for use in assemblies where optimum impact resistance is essential, the greater portion of commonly specified high strength aircraft steels are among those most susceptible. Therefore, the problem of properly treating these materials does exist, and should be approached with the aim of minimizing as much as possible, embrittling effects arising as a result of tempering in brittleness ranges.

In efforts to avoid excessive embrittlement of critical components during tempering, and to maintain a satisfactory balance between impact resistance and other mechanical properties, it may in some instances be found advisable or expedient to alter chemical specification of steels to those of modified analyses, which by virtue of properly selected carbon content will attain desired hardness and strength when tempered at temperatures removed from brittleness ranges and hence without any exaggerated tendency toward embrittlement.

ACKNOWLEDGMENT

Appreciation is expressed to W. Kilimnik for invaluable work in the preparation of test data and illustrations used, to other members of the metallurgical research group, and to the Lockheed Aircraft Corp. for sponsorship of the program and release of research material.

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* * *

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* * *

"Technical Dictionary," by Francis Cusset. Gives expressions in metallurgy, mining, electricity, chemistry, mechanics and science in English-French and French-English. Chemical Publishing Co., Inc., 26 Court Street, Brooklyn 2, 591, p. $5.

"The Aluminum Industry," by Stanley V. Malcuit. Monograph on over-all picture of aluminum industry and specialized information about the jobs that comprise the industry. Analytical index of occupations aids in locating information about specific jobs. Bellman Publishing Co., Inc., 83 Newbury Street, Boston 16, 36 p, $1.

* * *

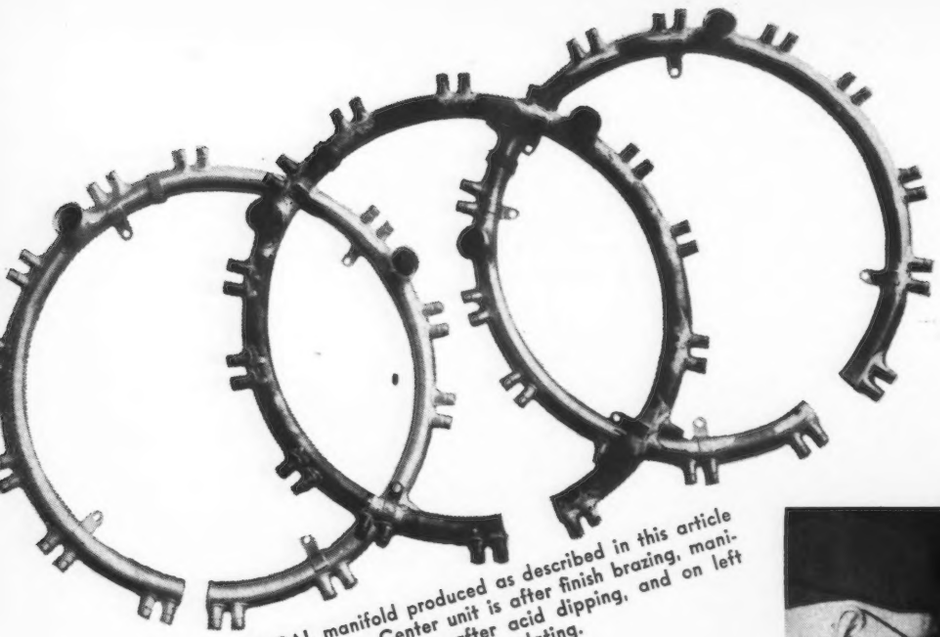
"The Metallurgy of Quality Steels," by Charles M. Parker. A semi-technical presentation covering basic information on the manufacture, working, testing, characteristics and uses of standard steel grades. Various heat treatments are described accompanied by discussions of metallurgical phenomena involved. Reinhold Publishing Corp., 330 W. 42nd Street, New York, 248 p, $6.

* * *

"Industrial Carbon," C. L. Mantell. Second edition covers the technologic applications of elemental carbon, aside from its use as a fuel. A reference chapter on the physical characteristics of carbon is included. D. Van Nostrand Co., Inc., 250 Fourth Ave., 472 p, $7.50.

Production

By F. T. VAN SYCKEL
Handy & Harman, New York



A TYPICAL manifold produced as described in this article is shown here. Center unit is after finish brazing, manifold to the right is shown after acid dipping, and on left after cadmium plating.

INCREASING use of radio in both private and commercial aircraft, as well as the probable future use of radar, places particular emphasis on the employment of radio shielding to the ignition systems of aircraft engines. Automobiles, cabin cruisers, and similar pleasure craft are finding a growing need for protection against the disturbing effects of electrical discharges from spark plugs and generators.

The Breeze Corp., Newark, N. J., has been outstanding for many years in the manufacture of this equipment, and was able to expand its facilities to produce enormous quantities for the armed forces during the war.

In principle, the ignition radio shield consists of a manifold, a tube of copper or brass of circular or square cross-section, through which ignition cables are run, with outlets in the tube for spark plug and magneto connections. These manifolds are of varied design, depending upon the construction of the engine. In some cases they are in two parts, one right and one left hand, bent into short circular arcs, with a connecting tube between them. In another instance the manifold makes an arc of almost a complete circle, and still another form is the in-line, with several tubes connected in parallel lines to make up one complete manifold.

The method of fabrication is briefly as follows: Brass tubing is cut to approximate size and bent to the requisite arc, depending upon the style and the design of the manifold. A hole is formed for each outlet to spark plugs and magneto, and sleeves are then brazed in place over the holes. One end of the manifold is capped, and the other end is fitted with a threaded flange for assembly to the other parts of the manifold.

One part, for example, consists of a bent tube, 1⅛-in. OD with a wall thickness of 0.032 in. It has a total segment angle of about 75°. The first operation on this tube is a light grinding on one end. This end is sized over a steel arbor, after which all burrs

FIG. 1—Brazing the threaded flange onto the end of the curved tube in a simple manual operation.

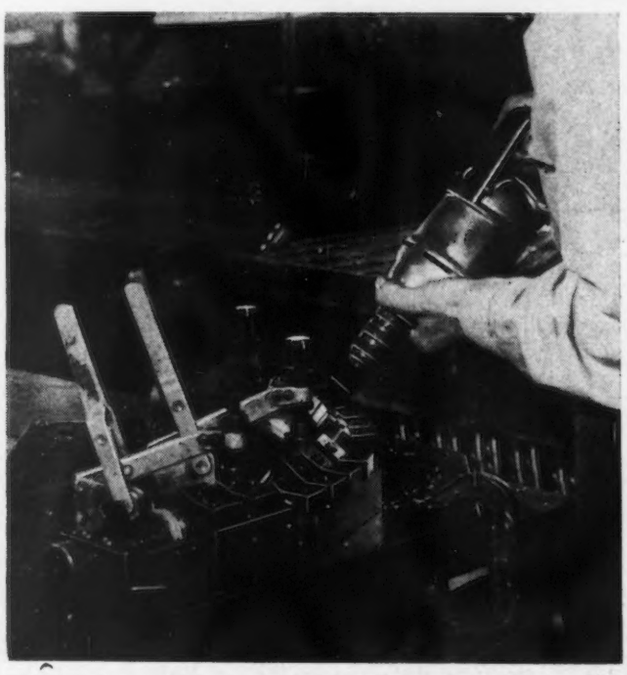


FIG. 2—By means of an electric hand drill and a suitable bench-mounted jig, holes are drilled through one wall of the tubing.

# of Ignition Radio Shields . . .

Production of ignition radio shields for aircraft, involving the extensive use of silver alloy brazing and special jigs, fixtures and gages, is described in this article. The production procedures outlined here are also applicable to similar units for automobile and marine shielding.

from the grinding operation are removed. The same end is then forced into a brass flange which is threaded on the outside and recessed on the inside.

The tube with its flange goes to the brazer whose first operation is to remove the flange and apply the torch to the ground end of the tube for a few seconds as a preheat operation. This end is then dipped in a Handy and Harman flux. The flange is reset on the ground and fluxed end of the tube, and the latter placed in a fixture with the flange downward.

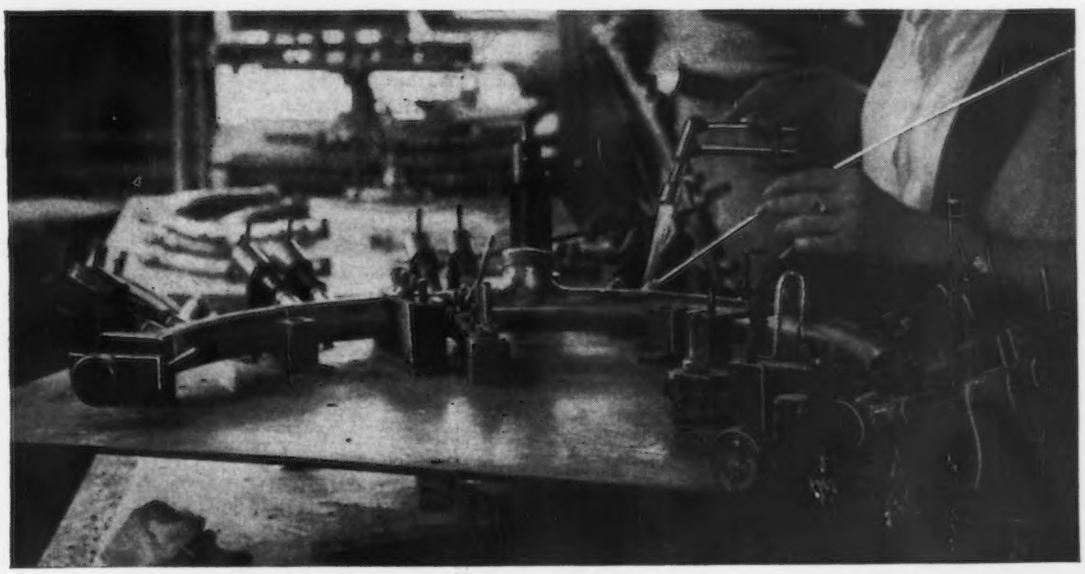
The parts are then brazed together by the use of a gas torch and a special H & H silver brazing alloy as shown in fig. 1. This alloy is in the form of short rods flattened from 0.020-in. wire which has been previously fluxed. When the braze is complete and the joint is solid, the parts are cooled in water for ease in handling.

Eight ¼-in. holes are now drilled through one wall of the tube, using an electric hand drill and a special fixture mounted on the bench, as shown in fig. 2, and in the following operation the holes are counterbored to ⅝ in. in a vertical drill press. All outside burrs are removed by grinding with a special abrasive wheel.

The next operation is known as extrusion, and consists of flaring the ⅝-in. hole toward the outside of the tube, thus producing a saddle around each hole. All holes are then completely burred. Later, outlets to spark plugs and magneto are set on these saddles and brazed in place.

A careful inspection for remaining burrs follows. It is vital that every edge throughout the entire assembly be free from roughness of any kind. The cables going through the manifold must not be abraded, the insulation must not be cut, and no scars or injuries to the wiring can be permitted which may later cause trouble in the ignition circuit.

Spark plug outlets are tacked into place, as shown in fig. 3, using a special holding fixture. Steel clips are also tacked to the tube in such a position that they can be used to support the manifold in place when



o o o

LEFT

FIG. 3—Tacking the outlets in place over each hole in the manifold. A rigid but easily operated fixture is necessary for this operation.

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o o o

RIGHT

FIG. 4—A simple holding fixture suffices for the final overall brazing. This is so arranged that the work may be swung into any desired position for downhand brazing.

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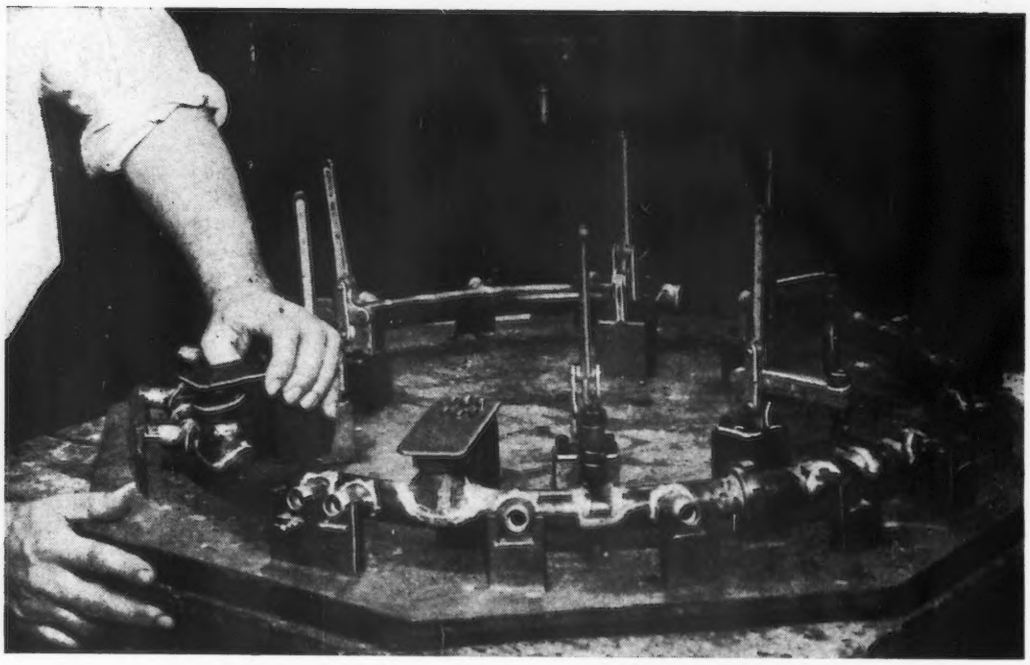

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FIG. 5—An inspection jig is employed for checking and adjusting the complete manifold for location and angle of outlets, and overall curvature.

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it is installed on an engine. Tacking is done by spot brazing at one or two points to hold the parts firmly in place.

Jigs for setting spark plug outlets consist of bench plates and quick acting clamps set around an arc to fit the curve of the tube. When the tube is placed in this fixture the clamps force the outlets to fit snugly and accurately over the saddle. If the fit is not correct, the jig rejects the pieces and an adjustment is necessary before any further operations are performed. If it cannot be adjusted, it must be rejected.

The next operation is finish brazing in which the job is completely and fully brazed. All saddles are fluxed, and all outlets are fluxed and completely brazed with the same type of pre-fluxed silver alloy rod mentioned above. A simple fixture, shown in fig. 4, permits the operator to work from almost any direction and to perform all brazing in a downhand position.

The manifold length is cut to exact size and a cap fitted onto the end opposite the threaded flange. This is simply a disc, cut to fit the cross-section of the tube. The tube end is deburred and the inside and outside fluxed. The disc is placed over the end and brazed on with a torch.

This step is followed by inspection in the inspection jig shown in fig. 5, and designed to check the positions of the outlets and to make the necessary adjustments. The tube has thin walls, and the curvatures and lengths are considerable; consequently the manifold may suffer from warpage under the heat of brazing. In this inspection jig, variations in angle and position are noted and adjusted so that linear dimensions are held to tolerances varying from 0.0025 in. to 0.010 in., and angles are held to within 1° to 2° tolerances.

The next operation is a bright acid dip to remove excess flux and oxides, and then a thorough rinse; after which the manifold is hand finished. All dents are removed, any remaining sharp edges are filed off, and every outlet is checked for proper thread dimensions.

A satin finish is provided by careful sandblasting, during which rubber caps are placed over all outlets to protect the threads, and a protecting collar is screwed over the flange threads.

Following the sand blast the assembly is inspected for brazing blowholes, excess brazing alloy, defects in the metal, or dents. All work that passes this inspection is forwarded to the plating room where it is given a cadmium plate to protect it from corrosion in service. Some manifolds are sprayed with a plastic covering.

After this plate, a rigorous final inspection takes place; rejections are made for minute defects, tiny scratches, or even fingerprint marks.

A noteworthy factor in the manufacture of these shields is the large number of brazed attachments in the assembly. An ignition shield is primarily a very large and careful brazing job. All brazes must be absolutely free of pinholes and be watertight. For obvious reasons, inspection of these shields is most servere. The specifications are rigid, the restrictions are stringent, and inspections must be frequent in order to catch defects immediately, and to prevent the shield from going into further processing with these defects.

An important problem in production has been the shortage of skilled help which forced the Breeze Corp. to recruit assistance from all quarters, raw, unskilled and wholly inexperienced in manufacturing. Nevertheless, the results have been gratifying. It has been found that the women who have come into industry make excellent inspectors, filers, thread chasers and even brazers. An interesting development of industrial education is the use of blind and otherwise physically handicapped workers. One of the best thread chasers at Breeze is a blind man whose fingers are so sensitive that he is able to test threads more rapidy and more accurately than anyone else in the plant.

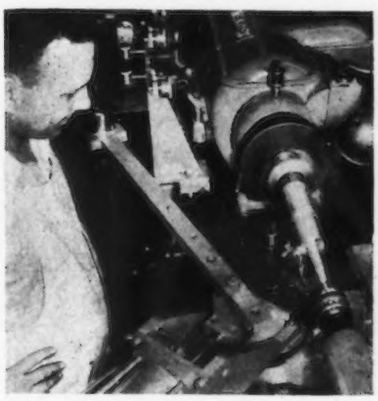
The company also has a number of workers who have suffered from infantile paralysis. These workers are unusually conscientious, trying especially hard to compensate for their physical disability. Their legs are helpless, but they seem to have compensated for this by developing hands and fingers which are more dextrous and more sensitive than the normal worker's.

New Equipment . . .

Small Tools

Recent developments in work and tool holding fixtures such as clamps, chucks, jigs and collets are presented in the following pages. A drill chip breaker, drillheads, abrasive wheels and dressers are among other small tools described.

DESIGNED to produce work pieces with contours which exactly correspond to a thin metal templet or master part, a simplified duplicating attachment has been introduced by the *Bailey Meter Co.*, 1050 Ivanhoe Rd., Cleveland 10. It is a combined air and hydraulic system which may be attached to engine lathes, turret lathes or vertical boring mills. Simplification has been achieved by applying a single hydraulic power cylinder to the lathe compound, which is usually set at 45° to the longitudinal axis of the work. When mounted at this angle and used in conjunction with the standard longitudinal feed, the single power cylinder controls both



longitudinal and in-out tool motion. Formerly it was necessary to apply power cylinders to both the longitudinal and cross feeds for full automatic operation. The duplicating attachment in no way hinders normal use of the machine to which it is applied, it is said.

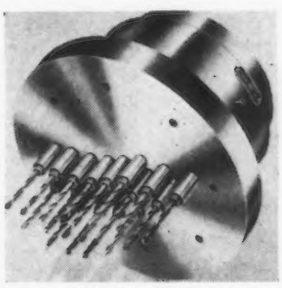
Drill Chip Breaker

A DRILL chip breaker, which breaks the chip at each revolution of the drill, has been introduced by the *Ex-Cell-O Corp.*, 1200 Oakland Blvd., Detroit 6. The unit breaks chips into uniform, small pieces that are easily carried up the flutes of the drill, it is claimed. In operation, the short chips accumulate around the mouth of the hole, eliminating the long, whirling

spirals which would otherwise be thrown around the machine and on the floor by the revolving drill. If the work requires coolant, it flows on the work and down the drill flutes, past the short loose chips to the point of the drill without splashing. The chip breaker can be used vertically, horizontally, or at any angle at which housing can be kept stationary while the drill rotates. An arm is provided to prevent rotation of the housing. Increased operating speed and prolonged drill life are said to be main benefits of the chip breaker.

Drillheads

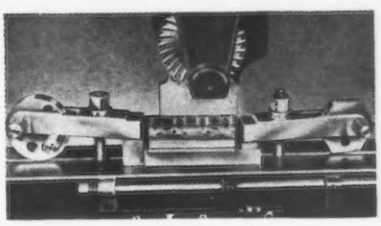
GEARLESS drillheads, manufactured by *Zagar Tool, Inc.*, 23880 Lakeland Blvd., Cleveland,



are claimed to do virtually any kind of multiple drilling or tapping jobs. Close center distances with practically unlimited number of drills accommodated in one head is an outstanding feature, with stock sizes ranging from ⅛ in. max diam drill on ¼ in. center distance to 1 in. or 2 in. Spindles can be relocated by reboring. Standardization of multiple spindle drilling, as well as great saving in time are other features. Heads can be furnished single or with all necessary tooling.

Work Holder Clamp

AN instantly adjustable work holder clamp has been announced by the *Industrial Engineering & Supply Co.*, 26 Hudson St., Ridgewood, N. J. The clamp, it is said, eliminates the necessity for using or securing extra small pieces of material in order to clamp work

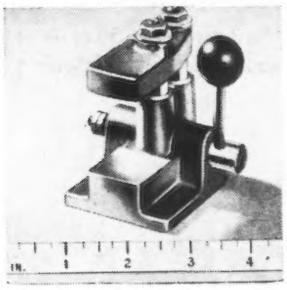


into position. Adjustments are obtainable in 0.026-in. steps and the clamp positions run from 50 to 128 different clamping positions for each clamp, depending on its size. They are made in five sizes and available in pairs of two complete units, in either round or Hex shapes.

Miniature Jigs

TO TOOL very small parts, *N. A. Woodworth Co.*, 1300 E. Nine Mile Rd., Detroit 20, has introduced two miniature Cone-Lok jigs, which despite their size are of rugged construction, safe in operation, versatile and possess a minimum of moving parts. The miniature jigs have the Cone-Lok mech-

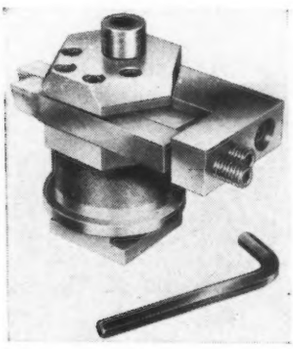
anism utilizing the braking power of perfectly mated male and female cones. Having a minimum of wearing parts, they may be assembled or dismantled in a very few moments



with no special skill or tools required and can be converted from right to left hand operation in two minutes, using no additional parts. The moving parts operate in an oil bath and no movement of working parts is possible without action of the operating lever. Two miniature size pump jigs are available for working spaces of 1 x 1 x 1 in. and 1 x 2 x 1 in.

Tool Adjustment Block

A TOOL adjustment block for use with the Howard tool holders has been announced by *Howard Dearborn Inc.*, 3370 W. 140th St., Cleveland. The adjustment block can be mounted on either side of the holder and has set screws for adjusting either tool when combination tooling is used. The slot design facilitates ease of changing tools or angle of tool set-



ting without changing the position of the tool holder. The holder can be installed for right or left hand turning or multiple cutting.

Machine Vise

UTILIZING 90 pct of the longitudinal capacity of the flat table surface of any machine with T slots the Milpal machine vise, manufactured by *Porterfield Mfg. Co.*, 749 East 15th St., Los Angeles 21, can be adjusted to hold work from zero to maximum capacity of the table. As a base, the vise makes use of the flat table surface of the miller or other machine having a flat table with T slots, thus allowing the full vertical capacity for work from table surface to cutting tool, as well as the full length of the table surface. The construction of the vise is of semisteel castings and true alignment is assured by key way in the base of the vise riding the T slot of the table. Jaws are operated manually by screw adjustment. Vises come in 5, 7, and 9-in. jaw widths, fitting T slots from 3 to 4⅞ in. between centers, 4½ to 6⅞ in., and 6 to 8½ in.

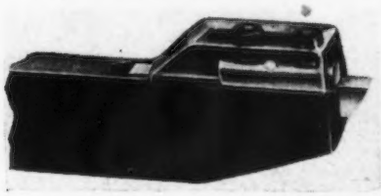
Tool Bit

CALLED the Shearcutter and utilizing the principle of molecular cleavage, a tool bit, which takes cuts two to three times

its nominal size and reduces production time as much as 50 pct has been developed by the *Fearless Tool Co.*, 1234 South Gramercy Place, Los Angeles 6. It is said to cut metal with a knife-like action instead of chiseling it off. Standard in size, this tool embodies a scientifically presharpened cutting edge and chip pressure channel which insures true shearcutting. Precision tolerances may be held with the Shearcutter bits and finishing cuts may often be eliminated. This cutting tool can be used on copper, brass, bronze, cast iron, steel and other ferrous and nonferrous alloys without changing the original grind, it is said.

Turning Tool Holders

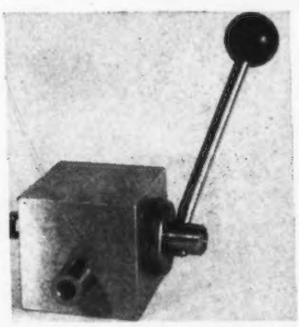
EMBODYING a feature for holding the cutting bit rigidly in place, a line of drop-forged lathe turning and cut-off tool holders has been announced by the *Industrial Tool Div.* of the *Cooper-Bessemer Corp.*, Mount Vernon, Ohio. The turning tool holders are forged from a special analysis steel known for its toughness, strength and maximum resistance to wear. A clamping pin engages the bit for nearly its entire length, and two flush-type set screws lock the tool



bit into position with a vise-like grip, preventing any possible slippage. A dowel holds the clamping pin in position for inserting the cutting tool and prevents the pin from falling out when the bit is removed. The cut-off blade holder holds the blade vertically with a clamping pin which engages a considerable portion of the blade, holding it to a true cutting position regardless of side pressure imposed on the blade. This model is available for both engine and turret lathes.

Fixture Clamp

THE Cone-Lok fixture clamp and unit have been added to a line of adjustable clamping jigs manufactured by the *N. A. Woodworth Co.*, 1300 E. Nine Mile Rd., Detroit 20. The fixture clamp employs the Cone-Lok mechanism consisting of male cones which are formed on the pinion shaft and which fit closely with female cones integral with the hous-

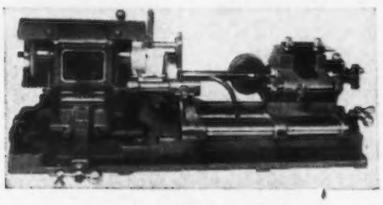


ing. A normal amount of wear on the cones is claimed to have no ill effects on the efficiency of the lock. Movement of the plunger is possible only by action of the operating lever. Work is positively clamped at any location desired in the stroke of the plunger, whose travel on the small size clamp is ¾ in., on the medium size, 1 1/32 in. and on the large size 1¾ in., these figures being based on a 180° travel of the

operating lever. The unit, also manufactured in three standard sizes, consists of rack, pinion, bushing and lever and is intended for adaption to fixtures and machines of special design.

Thin-Body Chuck

A TYPE of universal chuck, which depends on a single, pinion-operated, three-lobe cam to actuate the jaws, has been put on the



market by the *Edward Blake Co.*, 634 Commonwealth Ave., Newton Center 59, Mass. The design principles of the chuck allow the development of great jaw pressures on the work, making the grip positive. As used on the Blake tap grinder, the chuck can hold taps having diameters from 1/16 to 9/16 in. The cam-chuck was especially developed for the bent shank tapper tap attachment used on the Blake tap grinder, see illustration. As used with the attachment, the thin body serves two purposes: It allows the insertion, shank-end first, of bent and hook shank taps and it enables gripping the shank very close to the threads, where the concentricity of the shank with the threads is greatest. The cam-chuck principle can be applied to many other types of chucks, both general-purpose and special.

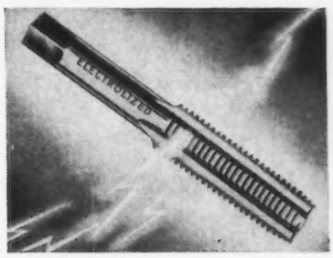
Precision Mandrel

A PRECISION mandrel with roller clutch expansion has been manufactured by the *Young Arbor Co.*, Dept. L, 3257 Bradford Rd., Cleveland Heights 18. Work placed on the mandrel is locked in place

automatically, ready for cutting tool, grinding wheel, deburring or polishing operations and eliminates the use of C washers, wrenches, or drawbars. When extreme cutting pressure is encountered this results in tighter holding of the work, and material worked under heavy pressure releases as easily, it is claimed, as under a deburring operation. No auxiliary power is required to expand the mandrel, and it is claimed it cannot be sprung or damaged under normal uses. This mandrel has interchangeable sleeves and maintains concentricity in the low ten-thousandths for the entire length of the workpiece, it is said.

Electrolized Taps

HIGH-SPEED taps treated by an electrolizing process which combines high voltage with a chemical bath and a rare metal to produce an exceedingly hard case on the cutting edges and the entire surface of the tap, have been offered by the *Electrolized Tap Corp.*, 148 West River St., Providence. This surface is a thin deposit of an unusually hard alloy, said to reduce chip and surface friction, and combined with its hardness increases the productive life of the tap. The dimensional accuracy of the tap and



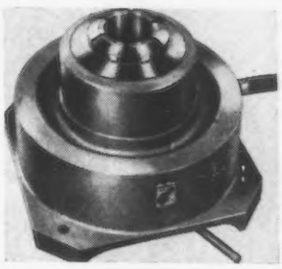
of the thread it produces are claimed to be unaffected by the electrolizing process as it adds only 0.00003 in., evenly deposited over the entire tool.

Tap Extractors

DESIGNED for accurate, quick and easy removal of broken pipe-threading-taps a group of ten new pipe tap extractors have been added as stock sizes by the *Walton Co.*, 94 Allyn St., Hartford 3. These pipe tap extractors incorporate the same principle as other Walton extractors, for hand and machine screw taps. They are available for all sizes of pipe taps from ⅛ to 1 in. inclusive for both regular and interrupted thread styles.

Air Collet

AIR collet, JC-2, has been added to the line of pneumatic work-holding equipment manufactured by the *Mead Specialties Co.*, 4120 N. Knox Ave., Dept. P-43, Chicago 41. This larger model of air collet will hold bar stock up to 2½ in. and with chucks, JC-2 will also handle shallow circular shapes up to 5 in. It is foot-controlled and can be used wet or dry. The coolant fountain,



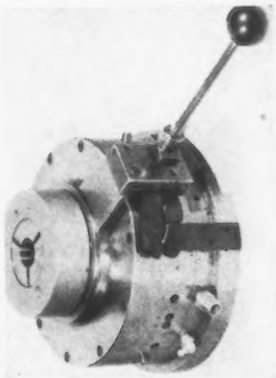
issuing through the collet, lubricates, cools and washes away chips. By means of a pressure reducer, the collet will handle delicate parts.

Precision Reamers

HAND and chucking reamers, straight and spiral fluted, have been announced by the *N. J. Daniels Tool Co.*, Haverhill, Mass. These precision reamers, constructed of carbon and high speed steel, are available in sets of various sizes ranging from ¼ to ½ in. by 16ths to ¼ to 2 in. by 16ths. They are said to be accurate to 0.0002 in. Individual reamers are furnished in transparent plastic tubes for protection and easy selection.

Index Chuck

DEVELOPMENT of an air-operated collet indexing chuck has been completed by the *Redmer Air Devices Corp.*, 601 W. Washington Blvd., Chicago 6, to provide ease of operations and to eliminate as much as possible errors in indexing. Indexing posts and numbers are located on the outside of

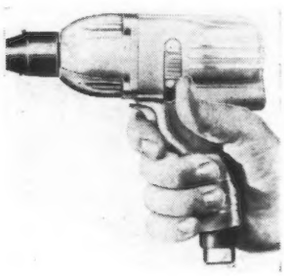


the fixture, eliminating the necessity of removing the fixture from the bed of the machine in changing over to another position. While the indexing is manual, the collet is air-operated, using a stationary col-

let in order to insure uniform depth and center of the work to be held. It has a capacity up to, and including, 2 in. The fixture is adaptable to tool room use as well as production runs, and can be used as a regular holding fixture. The index chuck has 2, 3, 4, 5, 6, 8, 9, 12 positioning indexes as standard equipment.

Impact Wrench

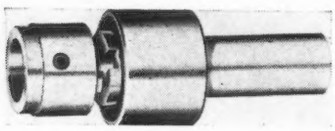
FOR driving and removing nuts, bolts and cap screws up to 3/8 in. thread size, a Thor pneumatic impact wrench has been produced by the *Independent Pneumatic Tool Co.*, 600 West Jackson Blvd., Chicago 6. This small, lightweight



wrench introduces a theory of impact mechanism designed to provide full striking power of the tool longer on steady production, assembly or maintenance. Rotatively striking impact jaws, set at a wide radius from the spindle center to reduce stress, and a short, rigid spindle shank that delivers the blow close to the work are the principles in the mechanism. Elimination of fastenings in the mechanism and compact, streamlined design of housings reduces weight to 3¾ lb. and length of the tool to 5⅞ in.

Releasing Tap Holder

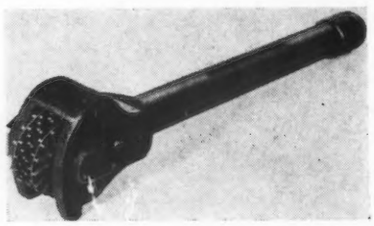
COMBINING Tool-Flex features of self centering and full floating, a releasing tap holder has been added to the Tool Flex line of *Burg Tool Mfg. Co.*, 6709 S. San Pedro St., Los Angeles. The flexibility of



Tool-Flex is said to compensate for parallel and angular misalignment, to eliminate binding which causes tap breakage, and to assure accurate tapping.

Wheel Dresser

DESIGNED to dress and true any wheel now being dressed by star dressers and many other wheels dependent on diamonds, the Samson grinding wheel dresser with forced-feed lubrication, has



been announced by the *G. J. Wallen Mfg. Co.*, 617 Bryant St., San Francisco 7. Grit cannot get into this tool, it is claimed, because bearings and cutters are completely sealed in pressure-fed grease. The pressure of the grease prevents grit from feeding back into the dresser. Accuracy is assured throughout the life of the tool, as bosses on each side prevent any side play. Grease that accumulates within the head of the dresser catches the dust or fine grit, preventing it from being inhaled by the operator, and grease does not accumulate on the grinding wheel but is thrown off by centrifugal force. Two sizes are available: No. 1 is used on wheels up to 12-in. diam and 2-in. face; No. 2 dresses wheels up to 60-80 grit and of diameters down to 3 in.; no wheel is too large for the No. 2, it is said.

Diamond Cup Wheel

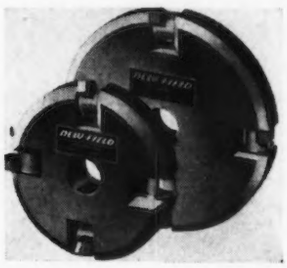
PUT on the market by the *Precision Diamond Tool Co.*, 102 South Grove Ave., Elgin, Ill., is a metal bonded diamond cup wheel to be used as a diamond honing wheel. The cup wheel is made in 3 and 4-in. diam and 500 mesh. It mounts on the inside of the 6 or 7 in. diamond cup wheels used on standard carbide tool grinders, and provides a fine cutting edge in a few seconds with one stroke across the honing wheel using the same protractor setup as used for the large wheel.

Cut-Off Wheels

BAYFLEX cut-off wheels incorporating abrasive in a cotton fiber bonding have been announced by the *Bay State Abrasive Products Co.*, 21 Union St., Westboro, Mass., as providing new and safer time-saving operations for cutting nonferrous metals. The increased toughness and balanced flexibility of an entirely new bonding material is said to give not only this safety factor with fast cutting, but the flexibility permits side grinding and close following of contours.

Fly Cutters

TWO extra heavy models of the universal fly cutter, designed for application on shell end mill arbors, have been announced by the



New-Field Machined Parts Co., 549 W. Randolph St., Chicago 6. They are 1⅜ in. thick, 6 in. and 8 in. in diam, allowing ample strength for machining driving slots and counterbores. Like other models they use four removable high-speed steel or carbide tips and are said to provide stock milling cutters with a wide variety of applications. They are provided in all standard arbor sizes.

Lathe File

RETAINING characteristics of previous lathe files designed by *Kennametal, Inc.*, Latrobe, Pa., and which cut steel up to 62 Rc hardness, do outstanding jobs on cast iron and nonferrous materials, and

permit filing operations at carbide tool turning speeds, is an improved model, providing longer filing surface, quick, easy blade replacement and greater handling convenience. The filing surface comprises two 4-in. long blanks, attached to an aluminum alloy handle by screws, permitting replacement. Two types of blades are available: Fine with 30 teeth per in. and coarse with 20 teeth per in. The handle grip has thumb rest and knuckle guard and the opposite end of the file provides a finger hold.

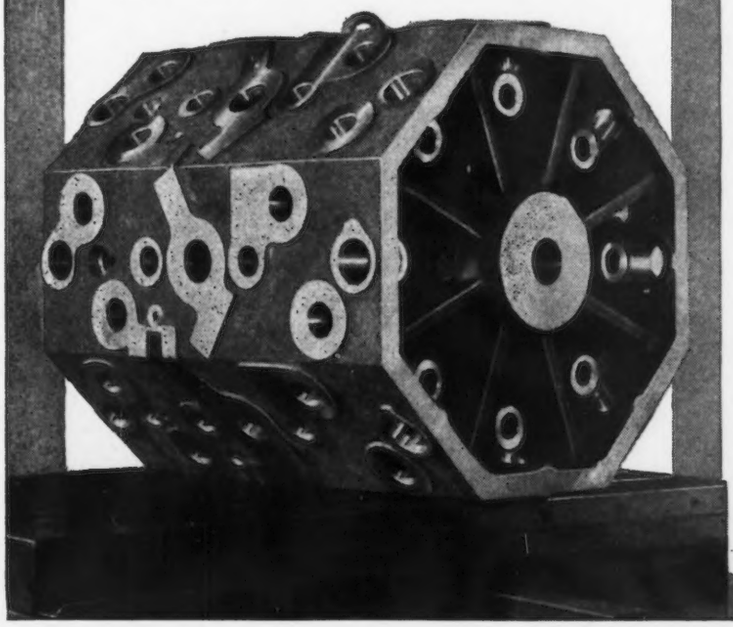
They're Building a Business around JIGMIL Performance!

JACK CUNNINGHAM and MATT JACKSON
Founders of Zip Tool and Engineering Company

The World's Finest Jig Boring and Milling Machine!

140 Holes—8 Faces, 2 Ends—Milled and Bored Complete to Overall Accuracy within .0005"! Floor-to-Floor Time: 75 Hours!

Typical JIGMIL work being done by Zip Tool and Engineering Company of Detroit is the large trunnion shown below. Made for a special precision index milling and drilling machine, its eight faces and two ends have a combined total of 140 holes! The entire job, milled and bored complete to overall accuracies within .0005", was done on the JIGMIL by means of push button controls! Total floor-to-floor time: 75 hours!



Recipe for a Business!

Take two skilled, enterprising mechanics, add one DeVlieg JIGMIL, and you have the essential ingredients required to start a good tool and machine business. That's the formula followed by Jack Cunningham and Matt Jackson in launching their own Zip Tool and Engineering Company in Detroit.

Both were tool-makers with JIGMIL experience; both saw the possibilities of building a business around JIGMIL performance. Pooling their assets, they managed the JIGMIL down payment, arranged for financing, then went to work. Now they're on the way toward needing a second JIGMIL in preparation for broadening their activities into a full functioning tool and machine business.

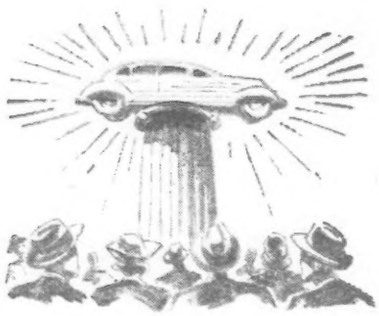
Technical literature describing 3-B DeVlieg JIGMIL design, construction and operation is available upon request. Write for your copy today!

DeVLIEG MACHINE COMPANY DEVLIEG JIGMIL **450 FAIR AVE. FERNDALE 20, (Detroit) MICH.**

Assembly Line . . . .

WALTER G. PATTON

• Automobile industry passes the million car mark . . . Strikes at Ford and Chrysler pending . . . Fisher Body Guild winners submit many novel car designs.



DETROIT—Since Jan. 1 the automobile industry has produced more than 1 million passenger cars in the United States. During the same period about half as many trucks were assembled in this country bringing the total U. S. car and truck output for the period above the 1,500,000 mark. If the present rate of production could be continued during the remainder of this year, U. S. car and truck assemblies would aggregate 3,300,000.

However, in the face of material shortages and a critical labor supply, most observers will be willing to settle for a much lower figure, suggesting a final 1946 total as low as 2,500,000 units, of which about 1,500,000 would be passenger cars. This estimate takes into account the fact that shortages of steel, lead, iron castings and pig iron as well as work stoppages may well interfere with motor car production during the remainder of this year.

The most encouraging aspect of the present automobile production picture is that total car and truck assemblies during the past two weeks have averaged almost 90,000 units per week in U. S. and Canada according to Ward's Reports, indicating an output for the month of August as high as 400,000 vehicles.

Despite high levels of production at present, shortages of supplies continue to hamper manufacturers; cushion springs, castings and forgings being the most critical items at the moment.

Because of a shortage of supplies and parts, both in its own and vendors' plants, the assembly of passenger cars and trucks at Chrysler will be halted this week. Not all departments of the corporation will be affected as the company will continue to attempt to build up stocks for future assembly and make spare parts for service. A company spokesman explained that Chrysler will continue to receive materials and supplies and take inventory during the period. The Chrysler plant in Canada remains strike-bound.

ANNOUNCEMENT of the one-week assembly shutdown coincided with submission by the UAW-CIO of a 60-day notice for reopening the Chrysler contract wage clause. The specific amount the union will ask has not been disclosed, but the union has announced that demands will be based on the trend of prices in the 60-day period commencing July 1. Some indication of what the union may have in mind was furnished this week by the United Rubber Workers-CIO who recently went on record as favoring an immediate "cost-of-living bonus" of one pct for every one pct in living costs.

The union claims that 50 to 60 pct of the 850,000 members of the autoworkers are under contracts which could be reopened on 30 to 60 days' notice. GM, Ford and Nash contracts freeze present pay rates until next spring, but Hudson, Studebaker and Packard contracts can be reopened.

The union was quick to deny that the Chrysler move means a second round of industry-wide wage demands. Walter Reuther, president, said that the whole issue depends on what the Decontrol Board, OPA and the Dept. of Agriculture do about controlling prices.

Meanwhile, the Foreman's Assn. of America is going ahead with plans to call a strike at the Ford Rouge plant where a 30-day foreman's strike notice expired on Aug. 26. Ford has offered to start negotiations on contract revisions at that time so the strike is not expected to get under way, if at all, until a later date. Included in the foremen's demands are union shop, dues checkoff and an annual wage.

The recent verdict of the sixth Court of Appeals at Cincinnati has undoubtedly strengthened the union's hand in the Ford negotiations. Upholding the NLRB, the majority opinion of the court declared:

"Although he (the foreman) is a part of management, negotiates grievances and performs manifold responsibilities, he is an employee with reference to wages and conditions of employment."

Ford is the only car producer having a contract with FAA. Packard and other manufacturers have declared their intention of carrying the foreman's unionization issue to the Supreme Court if necessary, even though there now appears to be little likelihood that that high tribunal will reverse the policy of lower courts in sustaining foreman's unions. FAA claims a membership of 40,000 foremen.

THE most interesting convention held in Detroit for some time took place this week when 30 boys, ranging in age from 12 through 19, who were regional winners in the Fisher Body Craftsman's Guild model car and Napoleonic coach competition, attended the final competition for university scholarships. As regional winners, the boys receive expense-free trips to Detroit to vie for national honors.

Nine scholarships were awarded, two each in the junior and senior divisions of both the car and coach competitions and one duplicate award in the junior model contest.

It is interesting to learn what these boy-members of the Fisher Body Craftsman's Guild expect to find in the automobiles of tomorrow.

The majority expect to see radical changes in automobile design.

Futuristic designs featuring rear engines, turbine-type cooling

Double Action

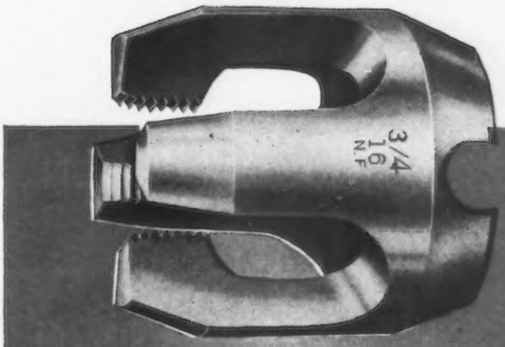
P&W Duocone Dies Assure Perfect Alignment and Provide a Positive Drive

Light . . . Strong . . . Compact . . . P&W Duocone Dies are designed and manufactured for use in automatic screw machines but will function equally as efficiently in semi-automatics, turret lathes and drill presses.

Duocone Dies will lower operating costs by giving maximum service in thread-cutting operations. When used with their proper Die Holders, Duocone Dies assure the operator of proper die alignment and provide a positive drive—"double action"—which increases production on your machines. Reversing Holders for Duocone Dies are available for automatics and releasing holders for semi-automatics, turret lathes and drill presses.

P&W Duocone Dies are the result of many years of laboratory and practical experiment. Correctly designed, scientifically heat-treated, and precision made, Duocone Dies are manufactured in accordance with the P&W principle—"produced under conditions of use". They comply with Pratt & Whitney standards of accuracy.

Write for circular.



A Word About Duocone Dies From One of Our Customers

"As you are aware we have used your Duocone Dies over the period of the past four years. These dies have been used in our Automatic Screw Machine Department to cut threads both standard as well as special and in a variety of materials ranging from stainless steel to bronze. In many instances when other means of producing satisfactory threads have failed, Duocone Dies have been the answer to some of our most difficult threading problems.

"We have found your Duocone Dies together with the holders as furnished for these dies by your company to be an exceptionally satisfactory method of producing good accurate threads on high speed screw machines as well as screw threading machines".

PRATT & WHITNEY

Division Niles-Bement-Pond Company

WEST HARTFORD 1 • CONNECTICUT

systems, curved windshields, and sweep-around bumpers predominate on the five model automobiles which won top national honors this week and $16,000 in university scholarships offered by the Guild in its 1946 model car building competition.

Virgil Exner, Jr., of South Bend, Ind., 13, youngest of the scholarship winners, submitted a miniature automobile with a rear engine cooled by distinctive radiators placed in the forward section of both rear fenders.

Exner, son of a former General Motors car designer, also built rear fenders that resemble air foils and extend beyond the body. They are protected by separate bumpers. Young Exner's model earned him a $4000 university scholarship as the co-winner of first place in the junior division of the Fisher Body Craftsman's Guild competition.

The other first-place junior $4000 scholarship winner, Robert Joseph Hartlieb, Jr., 16, of Allentown, Pa., emphasized unbroken lines on the body of his model. The hood and front fenders are joined together in unbroken lines and only slight depressions mark the point where back fenders meet the rear part of the body. Two parallel horizontal strips of chrome extend around the car.

ON a York, Neb., farm, the senior $4000 scholarship winner, Vincent J. Rauth, 19, envisioned a car with a rear engine cooled through radiators built into the forward part of the back fenders. In addition, Rauth's model features nearly complete visibility in all directions, a curved windshield, and sweep-around bumpers that protect all fenders.

Charles Clayton Bradley, 14, also of South Bend, emphasized a body built rather high in front and sweeping downward to a point in the rear of his model, which was declared second place junior winner for the nation. Bradley conceived a cooling system of turbine construction for his rear engine car and provided a roomy luggage compartment in the front. His award amounts to $2000.

The senior $2000 scholarship winner, 18-yr-old David Wayne Whitman of Jackson, Mich., constructed fenders on his model which extended the entire length of the body. The car is decorated with heavy chrome trim and has a conventional type drive.

Both Whitman and Exner hope to see their ideas take definite form in the automotive world since both want to make car designing a life work. Among the five, only Rauth is undecided on a career. Bradley hopes to become a mechanical engineer while Hartlieb plans to specialize in aeronautics.

Nearly a million and a half boys from 12 to 20 have participated in the Fisher Guild competitions during the past 15 years. Altogether a total of 62 have received free college or university training for their efforts.

In making the awards last week, C. E. Wilson, president of General Motors, made no effort to conceal his keen interest in the work being done by the Fisher Craftsman's Guild. However, the climax of the convention was reached when Harley J. Earl, head of the GM Styling Section, agreed to take the boys on a one-day personally conducted tour of the GM Styling department. Harley made available to the boys all the intimate knowledge and experience acquired by the GM Styling Section over a period of many years. An opportunity to learn the innermost secrets of a style designer is something any style engineer would jump at.

Judged from the standpoint of nationwide interest, the ideas it generates and the good work it has been doing for the past 15 years in developing an interest in craftsmanship and providing an education for worthy boys, the Fisher Body Craftsman's Guild appears to have assured itself an excellent future.

Plans December Meetings

New York

• • • **The 1946 winter** meetings of the Electron Microscope Society of America and the American Society for X-ray and Electron Diffraction will be held in Pittsburgh on Dec. 5, 6 and 7, at the Mellon Institute of Industrial Research and the University of Pittsburgh.

TUITION PAID: *Shown with C. E. Wilson, president of General Motors, are boy winners in the 1946 model-building competition of the Fisher Body Craftsman's Guild. The model cars and model Napoleonic coaches shown in the hands of the youthful builders are worth $32,000 to the winners. Each young craftsman received a scholarship ranging in value from $2000 to $5000. Left to right, they are: Front row, Walter Edwin Roth, Jr., 18, Detroit; Roger H. Oetting, 14, Detroit; C. E. Wilson; Leo C. Peiffer, 17, Cedar Rapids, Ia.; and Eugene Schwietz, 15, St. Paul, Minn. Back row: David Wayne Whitman, 18, Jackson, Mich.; Vincent J. Rauth, 19, York, Nebr.; Robert Joseph Hartlieb, Jr., 16, Allentown, Penna.; Virgil Max Exner, Jr., 13, South Bend, Ind., and Charles Clayton Bradley, 14, South Bend.*

here is the new

AIR-HARDENING TOOL STEEL

that gives you

EASY, LOW TEMPERATURE HEAT TREATMENT

VEGA

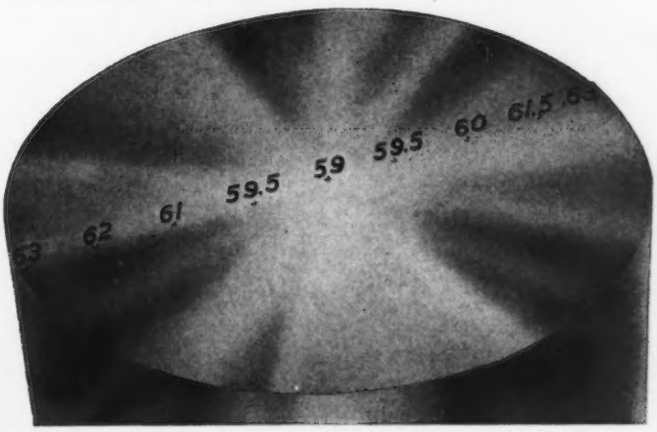
U. S. Pat. 2,355,224

The fact that VEGA can be heat treated from a temperature 200°F lower than the 5% chromium air-hardening steels often eliminates the need for expensive pack hardening to avoid excessive scaling. And because the hardening temperature for VEGA is only 1550°F, no special high temperature furnaces are required. These two advantages alone enable VEGA to do more than "pay its way" in your tool room.

UNIFORM HARDENING IN VERY HEAVY SECTIONS

This new steel combines the deep-hardening characteristics of air-hardening steels with the simplicity of *low temperature* heat treatment. Notice the uniformity of Rockwell hardness values from surface to center of this 8" VEGA round. On your jobs such as blanking, piercing, trimming and forming sheet metal in light and heavy gauges — jobs where minimum distortion and size change, uniform hardening in very heavy sections are required—VEGA gives you long tool life, low production costs.

Inside Rockwell "C" Hardness of Section Cut Midway on 8" Round x 15" Long VEGA. Air Cooled at 1550°F 1 Hour at Heat.



CHECK THESE EXTRA ADVANTAGES YOU GET WITH VEGA

- Minimum Distortion and Size Change
- Resistance to Decarburization
- Freedom from Excessive Scale in Hardening
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Washington . . .

L. W. MOFFETT

• Dept. of Commerce expands activities in fields of distribution, foreign trade and small business . . . Numerous committees to push enlarged programs.

WASHINGTON—Recent activities of Secretary of Commerce Henry A. Wallace's Dept. of Commerce have included the creation of a 28-man National Distribution Council, the inauguration of a trade relations program and expansion of a program of assistance to small business.

The Council's primary purpose, Mr. Wallace said, is to help American industry improve its distribution capacity and efficiency. The trade relations program, outlined by Arthur Paul, Assistant to the Secretary and Director of the Office of International Trade, is designed to provide the Department with continuing advice and counsel by representative foreign traders, manufacturing exporters and trade groups. Lawrence F. Arnold, former Director of the Office of Small Business, was made Assistant to the Secretary for Small Business, and Mr. Wallace said, will be responsible for generally giving leadership to and coordinating the small business activities of the Department.

The work of the Council, a voluntary group, will be coordinated with that of government by Under Secretary of Commerce Alfred Schindler.

Secretary Wallace said that the function of the Council will be to stimulate American business to utilize every practical means whereby America's ability to distribute and consume the country's products can keep abreast of the enormously increased capacity to produce.

"We must look forward to the not too distant day when the present seller's market becomes a buyer's market." Mr. Wallace pointed out, "If we are not prepared to meet that day, it can easily become the nation's number one problem."

UNDER Secretary Schindler declared that because of the failure thus far of peacetime production to go forward in full swing, a prolonged so-called seller's market has resulted. "In consequence," he said, "the distribution, which is to say, the sales machinery of the nation, is rusty in spots, flabby in spots, lazy in spots and greatly undermanned pretty much across the board, when it comes to selling twice as much product as we have ever sold before under peacetime conditions."

Raymond Bill, president and editor of Sales Management, will serve as Chairman of the Council. He said that the Council is working with the government on a three-point program: (1) That people in all walks of life will better understand what distribution is, how it functions and what it contributes to our American way of life; (2) that distribution will be more effective and efficient, both in the size of the total job that is done and in the quality of the ways by which it is done; and (3) that there will be better sales planning on the part of individual companies and industries.

Among members of the Council are: Gen. A. J. Browning, vice-president, Ford Motor Co., Detroit, former Director, Office of Domestic Commerce, U. S. Dept. of Commerce; C. Scott Fletcher, former vice-president in charge of sales, Studebaker Corp., executive director, Committee for Economic Development; Walter Fuller, president, Curtis Publishing Co., Philadelphia, former president, National Assn. of Manufacturers; George S. Jones, Jr., vice-president in charge of sales, Servel, Inc., Evansville, Ind., chairman, executive committee, National Federation of Sales Executives; Harold D. Laidley, manager, sales development and field personnel, White Motor Co., Cleveland, general chairman, 1946 annual convention of the National Federation of Sales Executives; and Don Mitchell, president, Sylvania Electric Products, Inc., former head of marketing div., American Management Assn.

THE purpose of the trade relations program, Mr. Paul said, is to develop and maintain a large volume of United States international trade effectively. With this end in view, the Office of International Trade has established a number of trade advisory committees. Permanent committees established so far are a 37-man Export Advisory Committee and a 28-man Import Advisory Committee.

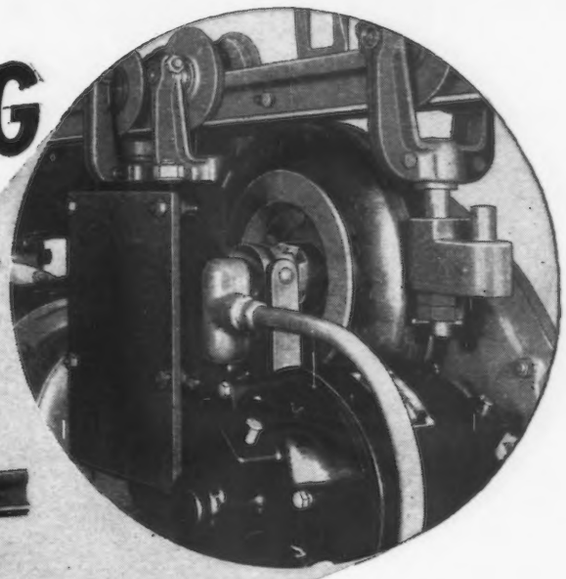
"We want to present not only our views, but also those of the U. S. business community when dealing with other United States Government agencies and with international organizations concerned with commercial matters," Mr. Paul pointed out. "Likewise, we want to interpret to the U. S. trade groups the policies and actions of this government in the field of international trade. We shall be better able to carry out these objectives with the cooperation of these committees."

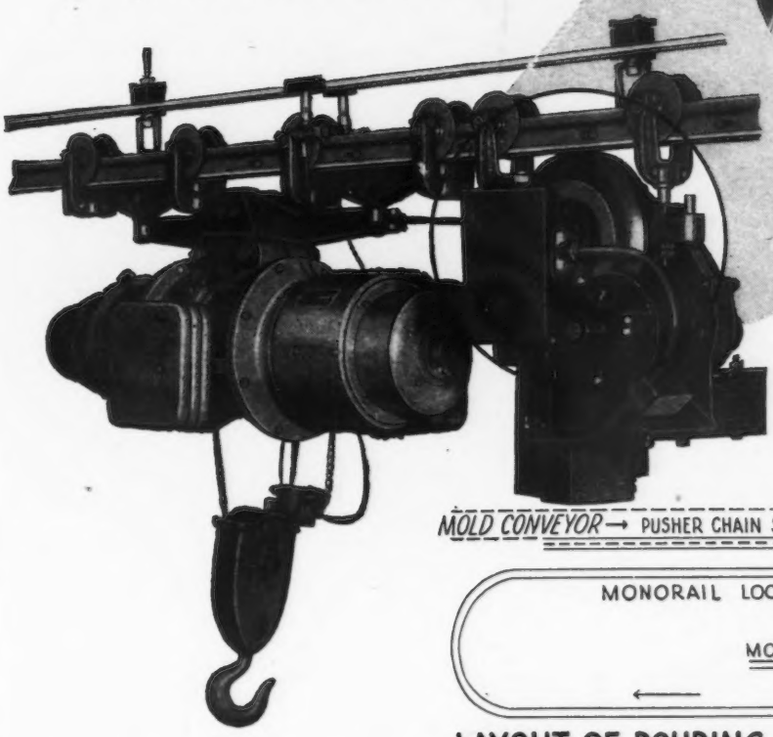
The recently appointed President's Committee for Financing of Foreign Trade, composed of bankers and businessmen, Mr. Paul stated, will also provide further counsel for OIT in the field of financial arrangements.

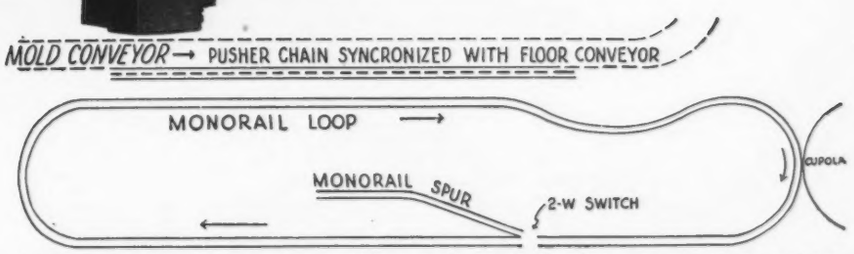
At recent, but separate meetings of the Export and Import Advisory Committees, discussions included the program of OIT. The report to the Secretaries of State and Commerce by the Advisory Committee on Commercial Activ-

FASTER POURING

with "Free-Wheeling" AMERICAN MONOTRACTOR







LAYOUT OF POURING LOOP FOR CYLINDER HEAD LINE

Here is another example of American MonoRail engineering with the American MonoTractor.

A rubber drive wheel propels a heavy bull ladle from the cupola to floor conveyor carrying flasks. When the unit reaches the pouring area, clutch disengages the MonoTractor drive wheel so that carrier unit can be picked up by an overhead pusher and moved along over the flasks at the same speed as the floor conveyor.

This enables the operator to concentrate all efforts on pouring. No worry about "keeping up" or "getting behind" the flask—operator forgets about horizontal movement and is able to pour metal faster and more accurately.

This principle is applicable to many conveyor lines for process in motion. Let an American MonoRail Engineer go into further details.

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ities in the Foreign Service, suggested changes in the Foreign Trade Zones Act, trade in occupied areas and in state trading countries. The export group also discussed the administration of the Export Control Act.

THE major objective of both committees was said to be to determine the best method of making a survey of the services and data now provided by the Dept. of Commerce to businessmen with a view to utilizing its funds for these services most effectively. The survey is now being made by these two committees. It was also proposed that business requests and problems, where more than one department is involved, be channeled through the Dept. of Commerce.

Supplementing the Export and Import Advisory Committee meetings in Washington, a General Advisory Meeting has been proposed for early fall on the West Coast to discuss problems peculiar to that section of the country. Another committee covering International Trade Services, such as banking, insurance, freight forwarding and advertising, will be established in time for a meeting the first week in October.

"In addition, committees will be organized to discuss special problems of individual industries," Mr. Paul said. "This has already been done for the machine tool and railroad equipment industries and a small tools group has also approached us for similar discussions. These committees will: (1) Examine the special foreign trade problems of their several industries; (2) study any situation in which we might initiate negotiations through the State Dept. for the modification of unduly restrictive foreign control regulations; and (3) consider the productive capacities of their respective industries in relationship to unfilled foreign demand."

AMONG members of the Export Advisory Committee are: Kenneth H. Campbell, manager foreign trade dept., U. S. Chamber of Commerce, Washington, D. C.; Paul Dietz, export manager, Allis-Chalmers Mfg. Co., Milwaukee; John D. Fletcher, vice-president, Caterpillar Tractor Co., Peoria, Ill.; G. C. Hoyt, vice-president, International Harvester Co., Chicago; J. R. Knights, export sales manager, Jones & Lamson Machine Co., Springfield, Vt.; W. S. Morrison, vice-president in charge of sales, U. S. Steel Co. (Export), N. Y.; Noel Sargent, secretary, National Assn. of Manufacturers, N. Y.; J. L. Stewart, Burroughs Adding Machines, Detroit; W. S. Swingle, vice-president, National Foreign Trade Council, N. Y.; C. B. Thomas, president, export div., Chrysler Corp., Detroit; R. C. Thompson, export manager, Electric Auto-Lite Co., N. Y.; and John W. White, president and general manager, Westinghouse Electric International Co., N. Y.

Among members of the Import Advisory Committee are: Robert W. Milbank, Jr., Milbank, Leaman & Co., N. Y.; D. A. Paterson, H. A. Astlett Co., N. Y.; Harry S. Radcliffe, National Council of American Importers, N. Y.; Fred Silence, W. R. Grace & Co., N. Y.; Paul A. Straub, Paul A. Straub & Co., Inc., N. Y.; William R. Strelow, Guaranty Trust Co. of New York, N .Y.; Richard F. Warner, Frazar & Co., N. Y.; and H. P. White, Hills Bros. Co., N. Y.

It will be the job of Mr. Arnold, Secretary Wallace said, to direct all appropriate resources of the Dept. of Commerce toward building of a well-balanced and permanent property, through a unified program of assistance to small business. There can be no prosperity, the Secretary added, unless small business prospers and expands. This program will be brought to small businessmen throughout the nation by 75 Commerce field offices under the expanded field establishment previously announced.

Mr. Arnold is a former Illinois banker and businessman. He was a member of the Illinois General Assembly from 1923 to 1927 and again from 1933 to 1937. In 1936, he was elected to Congress where he served three terms. He was a Director and Acting General Manager of the Smaller War Plants Corp. when it was liquidated in Jan. 1946.

Succeeding Mr. Arnold as Director of the Office of Small Business is James L. Kelly. Mr. Kelly a native of Bucyrus, Ohio, spent 12 yr as the head of his own small manufacturing concern in Mt. Gilead, Ohio, before he began his career in the government service in 1933. Prior to his new appointment, he was Director of the Disposal Policy Div. of the WAA. Earlier, he was a Chief Examiner with the Budget Bureau.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

HE'S SORE AND IS PACKIN' UP HIS TOOLS-- I BEGGED AN' PLEADED WITH HIM NOT TO QUIT, BUT--
LET HIM GO-- NEVER BABY 'EM! YOU GOT DIGNITY TO UPHOLD!
THAT'S RIGHT-- BUT HE'S ONE OF TH' BEST-- I-I'D OF-UH--
TH' BULL THINKS TH' WORLD OF HIM, YOU KNOW!
IF YOU WANT TH' VERY WORST ADVICE IN TH' WORLD, GO TO GUYS WHO ARE SUPPOSED TO BE DOIN' TH' SAME THING YOU ARE!
J.R.WILLIAMS
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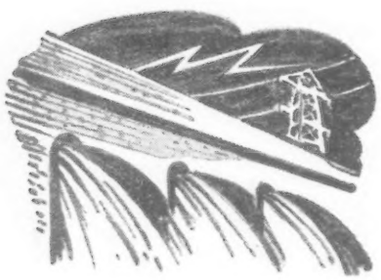
West Coast . . .

ROBERT T. REINHARDT

• Aircraft industry increasingly productive in spite of materials shortages . . . First auto wheel plant to operate on Coast . . . Veterans' housing is threat to Seattle industrial expansion.



LOS ANGELES—In the face of widespread complaints from most segments of the metalworking industry about material shortages and labor scarcities, aircraft producers on the Coast are working and producing at high level. A new aerial giant, new contracts for military and commercial planes, and plans of one manufacturer to double employment within the next year, have focused attention on the aircraft industry.

Lockheed Aircraft Co.'s "Constitution," 92-ton transport built for the Navy, came into the spotlight after 3 yr of top secret development. Designed to carry 168 passengers and 2000 cu ft of cargo, the plane measures 156 ft long, has a 189 ft wing span, and a tail 50 ft high. Four Pratt & Whitney Wasp Major engines develop 12,000 hp to carry the mammoth ship 6000 miles at a maximum speed of 300 mph.

The ship, designated the XR60-1, has an upper and lower deck and will carry 180 persons including the crew. The lower deck can be converted for cargo use to bring cargo capacity to 7400 cu ft. Useful load carried will be more than 69,000 lb. The wing structure has been designed in anticipation of gas turbine installation.

Features of the plane include pressurized cabin, cargo hoists of 10,000 lb capacity, and a galley capable of serving 300 hot meals. Landing gear consists of four-wheel construction in each main gear with a double wheel on the nose. When fully loaded, the plane is expected to be able to take off with a 2350 ft run. The first flight is scheduled for early October.

CONSOLIDATED Vultee Aircraft Corp. is getting a good share of civilian aircraft orders. Continental Air Lines has just placed an order for 15 Convair-240, 40 passenger ships. Delivery of the twin-engine planes featuring air conditioning and pressurized cabins is expected to begin in April of next year.

"King size" aircraft head the Consolidated Vultee development list. The 278,000 lb B-36, recently test flown, will have a troop transport counterpart, the XC-99. Weighing 265,000 lb, the 183-ft transport version is expected to be able to carry a 100,000 lb payload for 1500 miles. The six-engine plane will be double-decked, have an aluminum alloy fuselage and be readily convertible for use as a heavy cargo or hospital plane. Still another large-size craft is the projected Convair-37 transport. This sister ship of the XC-99 is proposed for commercial use as a passenger carrier with 200 to 300 person capacity.

Other projects under way at Consolidated Vultee include the P-81 combination gas turbine and jet propelled craft; the L-13 liason plane; Convair-240 commercial transport; and the Stinson Voyager "150" personal plane.

Experimental work continues at all plants in transonic and sonic range craft, jet and rocket propelled planes, and swept-back wing formations. Many of these projects will remain under secrecy wraps for some time to come, although several are expected to be announced very soon.

North American Aviation, Inc., announced a new Army contract for B-45 jet propelled planes and plans to double the company's production personnel within the next year in order to fulfill contract requirements. Production plans are already under way on the B-45's. Assembly work on P-82 Twin Mustang fighters is also expected to begin after completion of several months of preliminary production work and planning. Production of the "Navion," four-place personal plane, is gradually increasing, reflecting the effectiveness of the recent demonstration tour of the ship which carried it into some 60 cities piloted by an attractive young lady.

THE spectacular "Flying Wing" is now in production at Northrop Aircraft, Inc. Fifteen have been ordered by the Army, with a jet propelled version, XB-49, also planned. Reporter F-15, a photo-reconnaissance plane, continues in production along with development of the "Pioneer" a cargo craft designed primarily for use in overseas areas where maneuverability and short takeoffs are essential.

At Douglas critical materials shortages in national markets and the inability of several vendors to furnish certain parts, subassemblies and components not manufactured by Douglas have been responsible for temporary delays in delivery of the first allotments of DC-6 transports. Apparently Douglas is the only aircraft producer in the area seriously affected by shortages. By accelerating production in the first months of 1947, the company hopes to recover time lost and reduce to a minimum overall delays in airline fleet operations. The four-engine ship will carry a maximum payload of 14,250 lbs.

President Donald W. Douglas disclosed the company is not currently proceeding with development of the DC-8 transport. "This commercial version of the Army's B-42 'Mixmaster' has been temporarily set aside pending completion of engineering studies on the application of newer and more promising aeronautical developments to the commercial air transport field," Mr. Douglas stated.

Development of helicopter rotors

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and mechanisms has been added to Ryan Aeronautical Co.'s schedule of engineering and experimental work. Design and research in electronics and pilotless aircraft is included in the program. "We are carrying on the engineering and development of certain improved models of the 'Fireball' fighter, continued under previous Navy orders, and have contracted with the Navy for the design, development and manufacture of an experimental order of a new and advanced combat airplane of the jet-plus-propellor type. Engineering of this model is now well advanced and manufacturing is in progress," according to T. Claude Ryan, president.

Exhaust systems and heat exchange equipment continue as an important phase of Ryan's operations, with new orders for manifolds from Fairchild Aircraft for the Army's C-82 twin-engine "Packet" cargo plane and from Boeing Aircraft Company for its four-engine B-50 Superforts and C-97 Stratocruisers.

* * *

THE entrance of the Norris Stamping & Mfg. Co. into the production of passenger automobile wheels for the Ford Motor Co.'s western assembly plants is giving hopeful encouragement to dozens of trailer manufacturers on the Coast who have been held up in production by the scarcity of this essential part.

K. T. Norris, president of the company, said, "The effect of this new contract on western industry should be profound. Wheels have not been manufactured on the Pacific Coast before and thus they represent a new branch of the automobile industry for this area." The relation between the production capacity of Mr. Norris' company and the demands of Ford has not been announced so it is not yet known how much relief will be afforded other wheel users by this new producer.

The Norris organization is the second West Coast firm to obtain a large order for parts from Ford. U. S. Spring & Bumper Co. here has been supplying Ford plants in this area with springs, bumpers and fender guards since 1929.

ASK THE MAN WHO HAILS ONE: *Packard Clipper cabs are now coming off the assembly line at the rate of about 25 a day. In the accompanying photograph Patrice Munsel, Metropolitan Opera and radio star, flags the first Clipper ever hailed.*

* * *

R. W. Reno Engineering Co., at Torrance, Calif., has opened a steel fabricating plant to make steel truss joists, roof purlins and light structural steel framing. Mr. Reno was formerly sales manager, Soule Steel Co. at Los Angeles.

SALT LAKE CITY—Now that Geneva is a producing steel plant with total ingot production approaching one-third of capacity and practically all finishing facilities at work, rumors regarding the establishment of an industrial, or steel using, center in its vicinity are again floating about. There is considerable evidence that at least one manufacturer of heavy machinery is soon to build a plant near the local source of steel, and that others are looking for suitable sites.

The Union Pacific Railroad is already getting prepared for full scale operations at the steel plant and has taken steps to get 1000 cars to handle anticipated ore hauling requirements, according to Greoge F. Ashby, railroad president.

SEATTLE—While public bodies —chamber of commerce, traffic associations and similar groups— have gone to bat for the establishment of a lower freight rate on finished steel from Geneva, Utah, to this area, there seems to be a certain amount of indifference on the part of individual steel users. Typical comments from a dozen or more important steel users in this city were, "Oh, I hadn't thought about it much. Doubt if it would affect my business very much;" or "The net effect on my production costs of an $8.00 rate wouldn't be great and I want to know what the base price at Geneva is going to be before I get excited."

It is an understatement to report that there is no evidence that any large expansion programs or new developments hinge on the outcome of the rate petition.

Veterans' organizations are engaged in a campaign to have all critical building materials diverted from these classifications so that several thousand partially completed homes in the state can be made habitable. There is talk of throwing picket lines around all industrial and commercial projects until veterans' unfinished homes are done.

Considerable weight is being brought to bear on the state administration to support the veterans' demands and there is some reason to believe it may be effective. One of the key points of the program is the demand that industrial and commercial builders divert stockpiled materials to housing and that wholesalers and suppliers cooperate. Veterans' organizations contend that 29,500 homes will be needed in this state by the end of 1947.

With expanding industrials already crowded for space and getting construction approvals from CPA only after considerable difficulty, it is obvious that there will be opposition to the veterans' plan. Manufacturers insist that before they can provide more jobs for veterans, many of them must have larger plant facilities.

HYDRAULIC BALANCE

CANCELS OUT BEARING LOADS

And Means MUCH LONGER PUMP LIFE

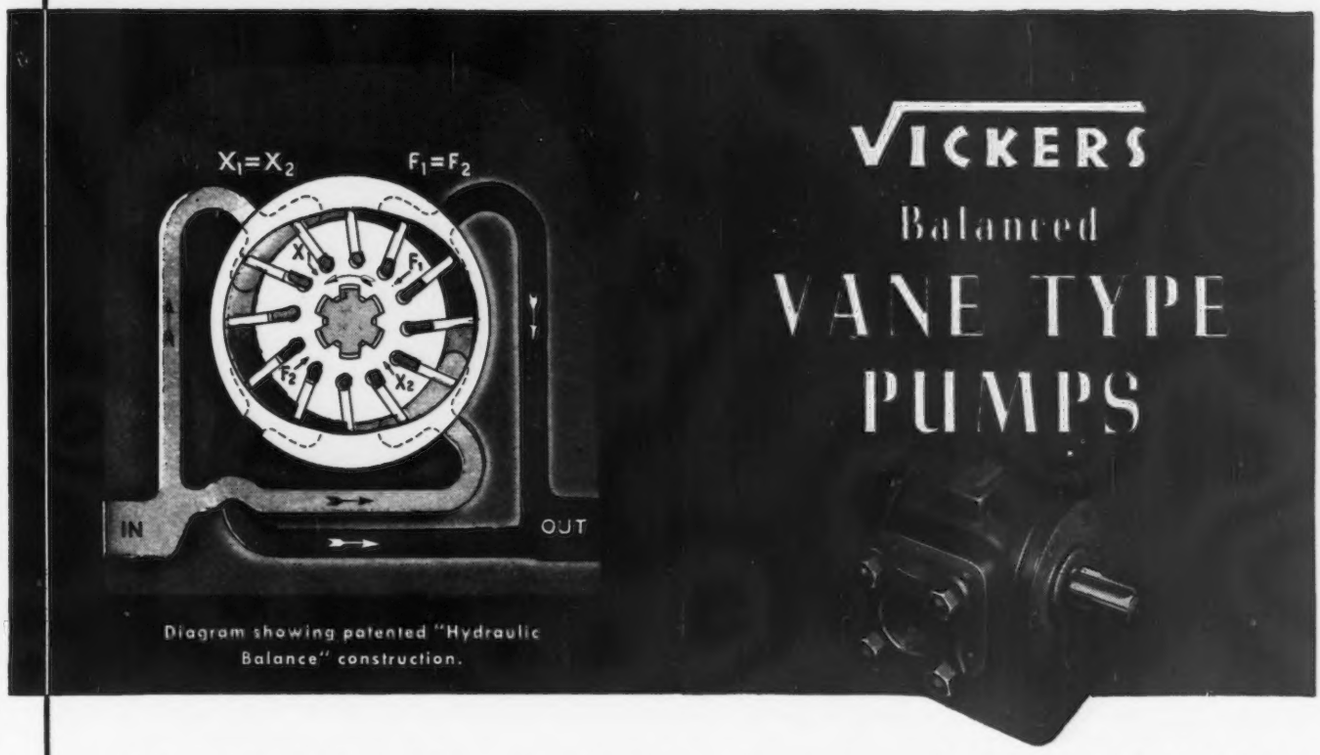

Diagram showing patented "Hydraulic Balance" construction.

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Vickers Balanced Vane Type Pumps are available in single-stage for 1000 psi (see Bulletin 40-25a); two-stage for 2000 psi (see Bulletin 40-16) and also two-pressure, large-small volume (see Bulletin 38-14). Vickers Application Engineers will gladly discuss with you the many different types of hydraulic power and control circuits on which these pumps have improved machine performance. Write the office nearest you.

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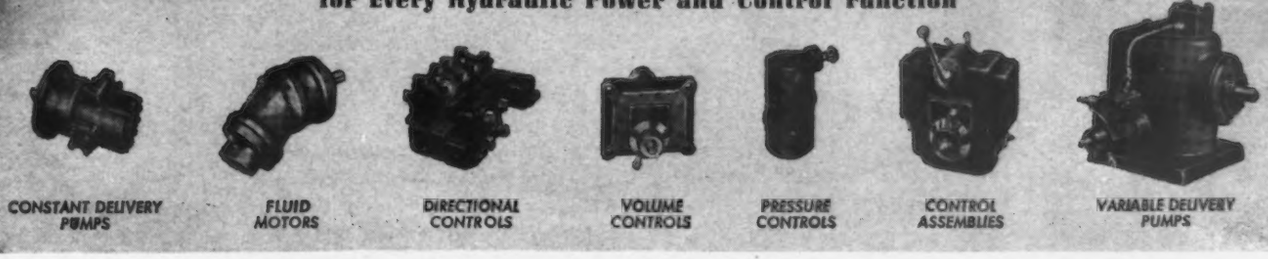

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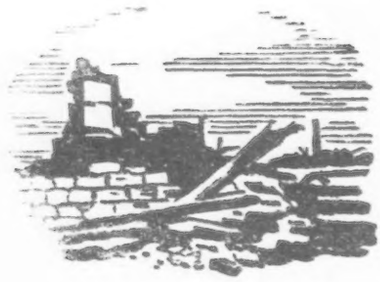
European Letter . . . .

JACK R. HIGHT

• Italian economists ponder absence of coal and iron ore . . . Large integrated plants are out of production . . . Coal controls operating rate.



MILAN—Conditions in Italian heavy industry are suffering much more acutely from a lack of activity than from war damage. While in some instances the damage was severe, and in at least one case the Germans carried off an entire steel mill, there is still far greater capacity than is in use. The lack of a positive government policy for the future of the industries, and the pessimism of some economists, who feel that there is no economic reason for Italy to have a heavy industry, combine to suffuse the whole planning with a feeling of lethargy and unreality.

There is a great deal of reaction here in the minds of many Italians against the uneconomic forcing of production under the Fascist regime. Between the wars, all types of production were pushed far beyond actual needs or competitive abilities, simply for nationalistic purposes. In the face of the chaos which such a policy wrought in many industries, there is a lot of conscientious soul-searching going on among men who stare glumly at Italy's lack of iron ore and coal, and say:

"Perhaps we had better give it up."

In Europe where an international coal shortage is one of the most immediate economic problems, a defeated nation which must import much of its coal finds itself in a serious plight. Many of the most serious problems that the Italian economy faces today are tied up with the coal shortage. Fortunately, the rivers still flow in the north, and at least in the summer months there is plenty of hydroelectric power which replaces the absent coal in a measure.

Small quantities of coal are available from Sardinia, but before the war about a twelfth of Italy's consumption came from the Istrian peninsula, now a part of Yugoslavia. At present, all of Italian imports are coming through UNRRA, mostly from the U. S., and a little from Germany. The exchange of information between the various European countries is so disrupted at present that I was amazed at the optimism among industrialists when I arrived here.

I ARRIVED by air from Frankfurt, only a few hours removed from conversations with the discouraged British experts of the North German Coal Commission in Essen, Germany. Those experts were plumping for a complete cessation of coal exports from the Ruhr. At the same time, the Italians, who stand far back in the coal queue, were optimistically expecting more coal from Germany. Their logic was a little obscure, mostly based on the fact that in prewar years there had been so much coal available that the shortage could not last much longer. These people were not ignorant, they simply have no access to the disheartening figures of today's coal supply and demand.

The Italian steel industry itself at the peak of its development in 1943 was so sharply divided that it could almost be described as two separate industries. Historically Italian steel production was carried forward in a number of small production units based fundamentally on high scrap consumption in the face of the Italian ore shortage. During the period between the two world wars, as the Italian industry worked itself into increasing financial difficulty, an agency of the Italian Government, Finsider, which is a branch of the Italian agency comparable to the Reconstruction Finance Corp., gradually acquired about a 50 pct interest in Italy's steel output.

Among the activities which Finsider sponsored was the development of three comparatively large integrated steel plants which heralded a new era in Italian production. These plants were laid down with the idea that Italy must have a steel industry and that the production units should be as efficient as possible. Of these three plants the works at Bagnoli, just outside Naples, was badly battered during the war, and although considerable repairs have been undertaken the operating rate remains very low.

PROBABLY the best of the three was the Cornigliano works just outside Genoa. This works at Genoa was actually never in operation as it was completed during the war when ore imports upon which it must depend were unobtainable. After the completed works had lain idle for several months the Germans decided to use the machinery in their own industry in the Ruhr and shipped everything that they could possibly move into Germany.

The Italians were told that the plan was to reestablish it on German soil in exactly the same form as it was in Italy, but actually the machinery was used for replacements in various plants scattered over most of western Germany. The third unit of triumvirate integrated plants was located at Piombino and was almost completely demolished by war action. Thus the steel industry remaining for present production in Italy consists primarily of the small production units based on scrap.

Finsider's activities during the war were subject to considerable criticism, particularly from within the steel industry, by men who favored the more traditional ideas of what Italian steel production should be. Thus some men who fought a losing battle in the period just before the war and saw Finsider proceed with the construction of the integrated plants, see the present situation as an opportunity to return to the status quo and are once more fighting the same battle. The two arguments are probably not as clear cut in the minds of the opposing parties as they might

The Milwaukee Road • Ray J. Moths

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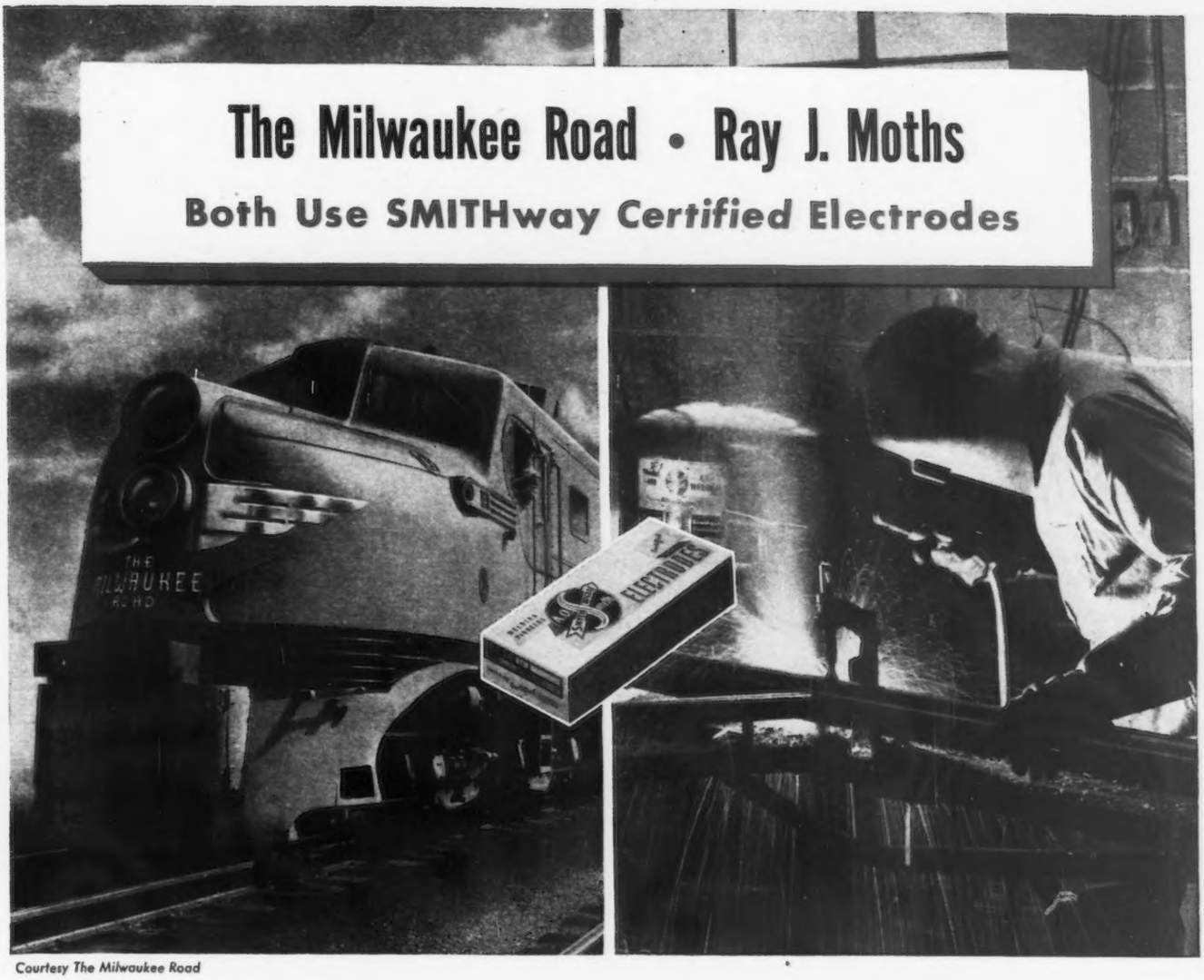

Courtesy The Milwaukee Road

The Milwaukee Road, one of America's great transcontinental railways, is famous for its fleet of streamlined Hiawathas, one of which is shown above. In the building of its own rolling stock, and in maintenance, The Chicago, Milwaukee, St. Paul & Pacific Railroad Co., knows that the proof of SMITHway Certified Electrodes is in production—*and in service.*

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INTERNATIONAL DIVISION: MILWAUKEE 1

be, since they are always a little confused with local political issues and occasionally a mutual distrust.

ON one hand the small plant proponents insist that Italy's steel future is in the production of those steel items in which the cost of labor represents a big proportion of the total cost of the product. In Italy where labor costs even in skilled lines are lower than in any comparable industry this side of India, this reasoning makes the best of good sense. In the minds of these small plant addicts the big government sponsored mills have tried too hard to produce certain heavy steel items in lines which will always be dominated by the larger producers elsewhere.

While the small plant owners disagree violently with the Finsider concept, most of them agree that for a government agency the large steel plants have had remarkably good direction with competent industrialists running the operations in most cases. There is a feeling that the expense in the big mills would have been much more unfortunate had they not availed themselves of the government treasury to make up for losses, but this was probably not due to bad management.

On the other hand the proponents of the large integrated mills are fighting from both front and rear and are calling down every authority known to man to justify their position. From the front they are carrying on a struggle to approve the concept against the ideas of the smaller steel producers while at the same time they are in the embarrassing position of no longer possessing a single operating integral production unit.

Repairs are being pushed at Bagnoli against a shortage of materials and fuel, and hopeless efforts have been made to make arrangements for the return of the machinery for Cornigliano, but the prospects seem very dim. At one time there were Allied Military Government officers in the north of Italy who assured Italians that all of their machinery had been located and was catalogued, and all they needed to do was apply for it, but as the months have passed this seems more and more likely to be wishful thinking, and in consideration of the completely muddled reparations' situation as far as the Big Four powers are concerned, most Italians have given up the battle.

THE activities of UNRRA which include the feeding of so many Italians also include a measure of indirect control of the heavy industry here. While the Italian Government controls all supplies of imported raw materials to the industry, UNRRA has interfered to the extent of assuring the flow of finished steel products to certain essential rehabilitation programs. In nearly every European country the freezing of steel prices at some point about the beginning of the war has had an effect similar to the result in America.

Steel firms were in a position where they were breaking even or losing money on certain basic heavy products as a result of low 1937-38 price levels, while they were depending on certain other more profitable items for their margin.

THE result in Italy as elsewhere was that as the trickle of steel production began to increase last year UNRRA found that too much steel was going into certain more profitable lines while insufficient quantities of railway materials and certain structural steels were being produced. UNRRA solved this dilemma by allocating certain additional quantities of coal to Italy and earmarking them specifically for certain reconstruction jobs.

There was a period shortly after UNRRA began its activities in Italy when there were troubles with excessive stocks of ingots and semifinished materials. This excess of stocks was due largely to the same factors which are encouraging the retention of ingot steel in Germany at the present time. In a country where the trend is almost certain to be inflationary, stocks of steel in the yard are far better from the company's standpoint than cash reserves of lira in a bank.

UNRRA officials in northern Italy feel that stocks have been worked down over a period of extremely short supplies, until they are as small as operating conditions will permit. They are certainly much smaller than a normal steel industry considers to be comfortable in times of steady demand.

There are some indications of indirect pressures and a lack of strong essential control which may be operating to the detriment of the reconstruction program, but this is probably quite natural in consideration of the ticklish position of the government. For example, present plans call for the opening of the first blast furnace to go into production in Italy since the end of hostilities there, not in the highly industralized north as would be imagined, but rather at the more or less isolated Bagnoli works outside Naples.

Industry officials in the north hold their nose descriptively as they call this "pure politics." The story here in Milan is that the decision to reopen the Bagnoli works was purely a local one in Naples, and that having effected as much repair work as possible the local authorities in Naples proceeded to buy a modest stock of coal in the black market (the only place where you can buy cigarettes or food or railroad tickets or a car or coal). They started the first openhearth and then told Rome officials that they expected allocations of coke to keep it going or Rome could take the responsibility for undoing the repair already completed. Blackmail is the term used locally.

French Imports of Coal In June Decline Sharply

Paris

• • • **French coal imports during** June last were the lowest since August 1945, amounting to only 629,582 tons. The tonnages from the Ruhr have decreased by 88,000 tons compared with the May figures, but it is expected that imports from Poland which began in May will improve.

Negotiations are under way for a commercial agreement which would allow the exchange of Polish coal against French goods or industrial products, particularly electrical products which Poland needs urgently for the equipment of its mines. The transport of coal is made by sea via the ports of Danzig and Gdynia, and by rail in French cars.

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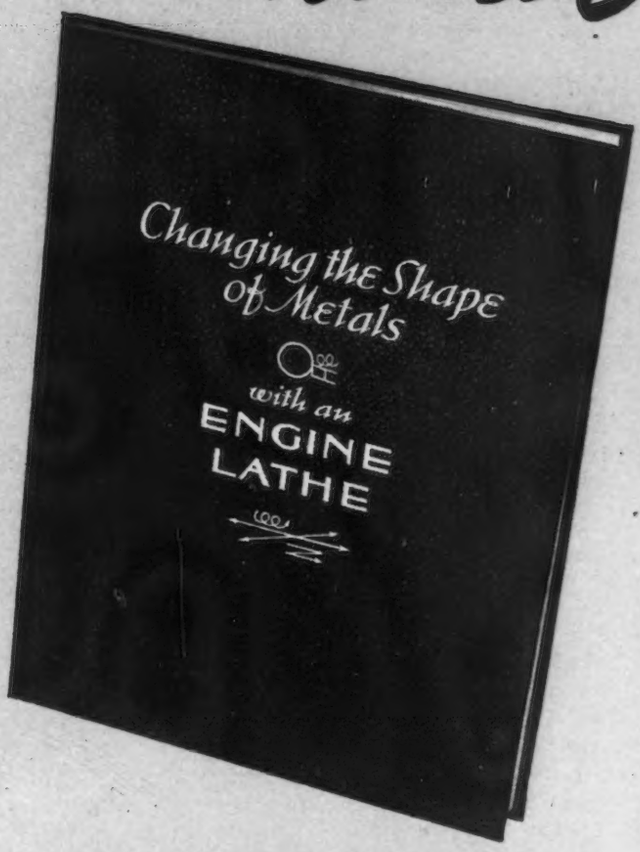

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PERSONALS

o o o

• **D. A. Williams,** president of Continental Steel Corp., Kokomo, Ind., since 1931, will retire as president as of the close of the present year and will become chairman of the board of directors. **R. K. Clifford** has been chosen to succeed Mr. Williams. Mr. Clifford was named vice-president in charge of operations of Continental in 1939, director in 1941, and vice-president and general manager in 1944.

• **John O. Forster** has been appointed chief engineer of Aircraft Screw Products Co., Inc., Long Island City, N. Y. He was formerly chief engineer for Bulova Watch Co., where he was responsible for research and design of aircraft accessories during the war years.

• **Norman H. Vacha** has been elected a director and appointed vice-president in charge of product development of the John C. Virden Co., Cleveland. Mr. Vacha served as a contact and production engineer during the war when the company was producing aircraft fuselage sub-assemblies.

• **Howard Oxsen** has been promoted to manager of the Seattle branch house of Fairbanks, Morse & Co., succeeding **John F. Marquitz** who will be assigned new duties elsewhere. Mr. Oxsen first joined the Fairbanks-Morse organization in San Francisco in early 1917 in the repair parts dept., was promoted to field service man, then field engineer and later Diesel engine dept. manager of the San Francisco branch from 1938 to 1945.

• **Birger G. Thele,** for the past 6 yr electrical engineer for the coal mine dept., has been promoted to chief engineer of coal mines, Tennessee Coal, Iron & Railroad Co., Birmingham.

• **William R. Thompson** has been appointed district manager for western Pennsylvania and **Edward G. Cressell,** district manager for Illinois, Indiana, and southwestern Michigan territory of Geary Stainless Steel Co., Baltimore.

• **A. C. Brown** has been elected a director of Republic Steel Corp., Cleveland, to fill an existing vacancy and **D. W. Cooper** has been appointed a member of the executive committee.

• **Frank W. Lorig** has been appointed division engineer of the Cyclone Fence Div., American Steel & Wire Co., Cleveland, and **Charles F. Negele** has been named division engineer of appropriations and properties, succeeding Mr. Lorig.

• **Richard E. Gauen** has been appointed manager of public relations of the Hudson Motor Car Co., Detroit.

• **Howard H. Hildreth** has been named assistant secretary of the Washington Steel Corp., Washington, Pa. He joined Washington Steel in December 1945, and until recently has been supervising the construction of the company's new Sendzimer cold mill.

HOWARD H. HILDRETH, assistant secretary, Washington Steel Corp.

• **James E. Allen,** vice-president of the Aro Equipment Corp., Bryan, Ohio, has been elected to the office of executive vice-president.

• **R. S. Slater** has been appointed manager of tank car sales of the American Car & Foundry Co., New York. He started his career with ACF in 1923 as expediter in the Material Assembly Div. of the ACF purchasing dept. in New York. In 1935 he transferred to the sales dept. and in 1936 was appointed sales agent in the New York sales dept.

• **Robert A. Lees** has been named manager of the American Anode, Inc. plant being constructed in Los Angeles and expected to be in operation late this fall. He joined American Anode Inc. as a chemist in 1929, and for 6 yr worked on research and development problems.

• **Michel Biscayart** has been appointed regional manager of the Foreign Div. of Norton Co., Worcester, Mass., and will have charge of the distribution of all Norton products in the Netherlands, Belgium, Switzerland, Portugal, and Spain. Mr. Biscayart was formerly assistant general manager of Compagnie des Meules Norton, the Norton branch factory in France, and will continue to make his headquarters in that country.

• **L. T. Wright** has been appointed sales manager of the Bunell Machine & Tool Co., Cleveland.

• **Hugo Hiemke** has joined the Pacific Coast division of the A. O. Smith Corp. as assistant director of the company's service and development laboratory in Los Angeles. He will work on technical problems arising in the company's West Coast plant and in the plants of two subsidiary concerns, the Sawyer Electrical Mfg. Co. and the Smith Meter Co. For the last year he has been research supervisor for the war metallurgical committee of the National Research Council.

R. E. THOMAS, purchasing agent, Dumore Co.

• **R. E. Thomas** has been appointed purchasing agent of the Dumore Co., Racine, Wis. He has served Dumore for 2 yr as chief accountant, and was previously secretary-treasurer of Indianapolis Brass & Aluminum Foundry. He succeeds **G. K. Tollaksen** who has resigned to enter business on his own account.

• **Alexander B. Andrews, Jr.** has been appointed engineering representative in North and South Carolina of the Kropp Forge Co., Chicago.

• **Arnold Thomas,** associated for the past 16 yr with the metallurgical dept., Engineering Div. of Chrysler Corp., has joined the sales staff of Peninsular Steel Co., Detroit, as metallurgical contact and sales representative for the state of Michigan.

• **Harold E. Jalass** has been appointed assistant general sales manager of Cribben & Sexton Co., Chicago. Mr. Jalass came to Cribben & Sexton in 1917. In 1922 he joined the sales dept. covering Chicago and supplementing other territories throughout the country. For the past 15 yr he has been district manager in metropolitan Chicago area. He will continue in this capacity, in addition to his new duties.

• **Edward C. Hamm** has been elected president of Service Caster & Truck Corp., Albion, Mich. In 1943 he resigned his position as Signode Steel Strapping Co.'s assistant director of sales to become sales manager of the Service Caster & Truck Div. of Domestic Industries.

• **B. A. Trepaske** has been named assistant director of farm sales for Graham-Paige Motors Corp., Detroit.

• **George W. Walker** has been appointed director of purchases for the Lincoln-Mercury Div. of Ford Motor Co., Dearborn, Mich.

• **Arthur I. Schell** has been appointed general manager of the Hope Machine Co., Philadelphia.

• **Roy D. Chapin, Jr.** has been appointed midwest regional manager of Hudson Motor Car Co., with headquarters at Detroit. Mr. Chapin joined the Hudson engineering dept. in 1938 and entered the sales dept. in 1940. He has been in sales work since that time except while serving with the aircraft section of the War Contracts Div.

• **Robert L. Spencer** has been appointed patent attorney for the Crosley Corp., Cincinnati, replacing **Alden D. Redfield** who has been patent attorney for Crosley for the past 6½ yr. Mr. Redfield has accepted a position as patent counsel with the Aviation Corp., parent organization of the Crosley Corp. Prior to joining Crosley Mr. Spencer served 3 yr in the Naval Air Forces. He was for 2 yr previous patent attorney for the Bendix Aviation Corp.

• **Kenneth F. Thomas** has been appointed district engineer for the New England office at West Hartford, Conn., of the Kaydon Engineering Corp. For many years Mr. Thomas has been active in New England and the East as sales engineer for S.K.F. Industries.

• **Ilia I. Islamoff** has resigned as vice-president of Bellanca Aircraft Corp., New Castle, Del., with which he was connected for 18 yr. Mr. Islamoff was acting general manager, beginning August 1944. For the 8 previous yr he was factory manager.

• **C. H. Pell** has been named director of purchases for Ward La-France Truck Div., Elmira, N. Y. Prior to coming with Ward La-France, Mr. Pell was associated with Kaiser-Frazer Corp. as purchasing agent, and before that was affiliated with U. S. Cartridge Co. in the same capacity.

• **M. D. Burns** has been appointed general manufacturing manager of the Radio Tube Div., Sylvania Electric Products Inc., Emporium, Pa. He joined the company in 1921 and served progressively as a supervisor of quality, supervisor of factory engineering, plant superintendent and plant manager.

• **A. D. Andriola** has been appointed chief research engineer of De Laval Steam Turbine Co. of Trenton, N. J. Mr. Andriola, who since 1941 was assistant to the vice-president in charge of engineering of the Cramp Shipbuilding Co. of Philadelphia, will work directly with C. R. Waller, vice-president in charge of De Laval engineering.

A. D. ANDRIOLA, chief research engineer, De Laval Steam Turbine Co.

ROBERT C. MYERS, assistant manager, Market Development Div., Carnegie-Illinois Steel Corp.

• **Robert C. Myers** has been appointed assistant manager, Market Development Div. of U. S. Steel's Carnegie-Illinois Steel Corp. sales dept., Pittsburgh. He joined the sales promotion bureau of Carnegie-Illinois in 1939. During the war, he was in the Navy on active duty for nearly 5 yr.

• **Elmer J. Klebba** has been named traffic manager for Pontiac Motor Div., General Motors Corp., Detroit. Mr. Klebba joined Pontiac in 1933 and has been assistant traffic manager for the last 6 yr.

• **D. E. McGuire,** assistant to the general works manager for Great Lakes Steel Corp., Detroit, has been appointed chief engineer. Mr. McGuire came from Trumbull Steel Co., Warren, Ohio, in 1929 to join Great Lakes as assistant chief draftsman.

• **Jack A. McConnell,** former employment and personnel manager for the Delco Products Div. of General Motors Corp., has been appointed sales representative in the Columbus, Ohio, territory for Automatic Transportation Co., Chicago.

• **Charles J. Ramsburg, Jr.** and **Eugene F. Conroy** have been promoted to assistant district managers of the New York office, Spang-Chalfant Div. of the National Supply Co. **Edwin A. Booth** has been made Pittsburgh district manager and **Frank W. Morris,** manager of the Tulsa district. Mr. Ramsburg had been manager of the Pittsburgh district since 1939 and during the war also was manager of the ordnance dept. sales. Mr. Conroy from 1913 to 1940 was with the Central Tube Co. at which time it merged and became a part of Spang-Chalfant. During the past 6 yr he has been a member of the sales staff of the company's New York office. Mr. Booth, the new Pittsburgh district manager, had been manager of the Tulsa district since 1942. He entered the metallurgical and research depts. of Spang-Chalfant in 1929, and later transferred to the sales dept. Mr. Morris, new manager of the Tulsa division, had formerly been associated with the American Car & Foundry Co. and the General Petroleum Corp. before he entered the sales dept. of Spang-Chalfant.

• **Marc M. Harrison** has been appointed sales manager of the Aluminum Window Corp., Long Island City, N. Y., subsidiary of General Bronze Corp. Mr. Harrison, who was last associated with Price Bros. Co. of Dayton, will handle Alwintite products.

• **Clare R. Metcalf** has been named secretary of Oster Mfg. Co. Mr. Metcalf joined Oster in 1912 and has held various positions, including that of credit manager and assistant sales manager.

• **George G. Deverall** has been appointed sales representative of New York Belting & Packing Co. in New England, New York, New Jersey and Eastern Pennsylvania. He will make his sales headquarters at the company's plant in Passaic, N. J., where he had been employed for 15 yr previous to his military service in the Army.

• **Warren H. Farr,** vice-president of the former Budd Wheel Co., has been appointed vice-president in charge of manufacturing of the Budd Co. Mr. Farr's headquarters will be in Philadelphia.

• **J. A. Stryker** has been made New England representative of the North American Iron & Steel Co., Inc., Brooklyn. He will make his headquarters in Boston.

OBITUARY...

• **Stanley R. Motch,** vice-president and treasurer, the Motch & Merryweather Machinery Co., Cleveland, which he helped organize in 1904, died Aug. 20.

• **Elbert M. Kimble,** gear engineer for Eaton Mfg. Co., Cleveland, died Aug. 15.

• **Ned Gardner,** general sales manager of the Hanchett Mfg. Co., Big Rapids, Mich., died suddenly Aug. 14.

• **Seymour M. Jenkins,** 54, died on Aug. 13. Since 1928 he has been associated with the Building Materials Div. of the Armstrong Cork Co. for the last 12 yr as an insulating brick salesman in the New York territory.

• **Robert B. Crawford,** vice-president of Atlas Foundry Co., died in Detroit Aug. 12. He was a past president of the Detroit Chapter, American Foundrymen's Assn.

• **Rezin H. Hodges,** 56, sales manager of the Baltimore division of Revere Copper & Brass Inc., New York, since 1931, died Aug. 13. He began his business career in 1907 with the Baltimore Copper Smelting & Rolling Co. When that concern became a part of Revere 18 yr ago he was assistant sales manager, later becoming sales manager of the new division.

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Dear Editor:

SHEET PRICES

Sir:

In checking iron and steel prices in your issue of July 4 against Carnegie-Illinois Steel Corp.'s price list No. 3, effective Feb. 15, we note that you show a base price at Chicago on hot-rolled sheets of 2.425¢ and on cold-rolled at 3.275¢, whereas the Carnegie-Illinois price sheet shows a base at Chicago for hot-rolled sheets of 2.455¢ and for cold-rolled sheets of 3.305¢. We will appreciate your advising the cause of this discrepancy.

J. MORIARTY
Midwest Mfg. Co.
Galesburg, Ill.

● The steel corporation's list quotes on a delivered Chicago district basis and includes the switching charge. Our quotation is f.o.b. Chicago and hence does not include a switching charge.—Ed.

INQUIRY FROM GREECE

Sir:

We read with great interest the article "Synthetic Detergent Additions in Cleaning Baths," published in the Jan. 31 issue. As we are interested in the use of Nacconal NR of the Allied Chemical & Dye Corp., the address of which corporation we do not know, will you kindly forward our inquiry to them?

SHEET STEEL & TIN PLATE CO., LTD. OF GREECE
Athens, Greece

ARMY SQUAD SHELTERS

Sir:

In the Aug. 2, 1945 issue you published an article on portable Army squad shelters. Are you in a position to furnish us with the name of the concern that produced these shelters for the Army?

GEORGE W. SHOMO
Treasurer
Confer, Smith & Co., Inc.
Hamburg, Pa.

● We are forwarding you a tear sheet of p. 93 of the July 12, 1945 issue which will give you names of companies that produce these portable Army squad shelters.—Ed.

TECHNIQUES AND TIME STUDY

Sir:

Enclosed herewith is a check for 60¢ covering the cost of your booklet entitled "Techniques and Time Study —Incentives and Job Analysis."

CHARLES A. HUNTER
Plant Cost Accountant
Reynolds Metals Co.
Louisville 1

● Reprint has been mailed.—Ed.

STENCIL FOR TUBING

Sir:

We were interested to read on p. 74 of the Nov. 22, 1945 issue the article on stenciling on tubing and bar stock by the use of a new stencil holder developed at the Glenn L. Martin Co. We would be grateful if you would advise us the name of the maker of this equipment or, if possible, forward our inquiry to them so that they might supply us with details and submit to us a price for a supply of same.

COMMONWEALTH STEEL CO., LTD.
Waratah, New South Wales
Australia

● Your inquiry has been forwarded to the Glenn L. Martin Co., Baltimore.—Ed.

DELAYED INQUIRY

Sir:

In "Automotive Industries" of Feb. 25, 1939, a description was given of reports obtainable from you. I should be very grateful if you would kindly inform me whether the possibility of obtaining some of these reports still holds good despite the fact that such a long time has elapsed since the advertisement was published. . . . If against expectations some of these reports should not be obtainable, I would be glad to receive at least the title "How To Calculate the Critical Temperature of Any Steel," in which I take a keen interest.

T. BACKMAN
A/B Landsverk
Landskrona, Sweden

● Reader Backman's request took us deep into our dusty back number files but we have managed to obtain copies of all the articles which were requested and are forwarding them to him with our compliments.—Ed.

TURBOSUPERCHARGERS

Sir:

Please forward us several copies of the article "Metallurgical Development of Materials for Turbosuperchargers and Aircraft Gas Turbines" by W. L. Badger, which appeared in the Aug. 1 issue.

R. SCHEMPP
Assistant Manager, Halcomb Works
Crucible Steel Co. of America
Syracuse 1

IMMERSION HEATING

Sir:

Would appreciate receiving a copy of the article "Gas-Fired Immersion Heating" as appeared in the July 11 issue, pp. 46 through 52.

R. G. JOHNSON
Plant Engineer
Midwest Mfg. Co.
Galesburg, Ill.

DESCALING WATER JETS

Sir:

We have read with interest the article "High-Pressure Water Jets for Descaling" in the July 11 issue. Do you have any information on an American product of similar nature or perhaps you could give us the name of the American representative of the Harland-Aldrich Co.

E. L. MAGNUS
Manager, Rolling Mill Development
Signode Steel Strapping Co.
Chicago

● We have not been able to locate an American representative of the Harland-Aldrich Co. We recommend that you get in touch with the following manufacturers of descaling nozzles who can undoubtedly advise you if there is an American counterpart of the jet described in the article: Spray Engineering Co., Somerville, Mass.; Chain Belt Co., Milwaukee, and Aldrich Pump Co., Allentown, Pa.—Ed.

DATA FOR AN APPRENTICE

Sir:

I am employed as an apprentice machinist at the Mare Island Navy Yard. Your magazine is very interesting reading and has helped me a lot in my work. I am interested in obtaining articles dealing with machine shop practice which have appeared in past issues and would like to know how I can obtain them.

LEWIS HORATES
Navy Yard
Mare Island, Calif.

● We are forwarding you, with our compliments, a collection of reprints of recent articles on machine shop practice.—Ed.

TUCKER CORP. ADDRESS

Sir:

Would you kindly let us have the mailing address of the new Tucker Corp. which is written up on p. 106 of the July 25 issue?

M. WALLACE
Wallace Scrap Iron & Metal Co.
Ithaca, N. Y.

● The Tucker Corp.'s plant is located at 700 N. Hudson Ave., Chicago 20.—Ed.

CONSTRUCTING DWELLINGS

Sir:

We would be interested in receiving the article on dwellings being built in Great Britain by George Wimpey, which appeared in the Dec. 6, 1945 issue. A summary of this appeared in the February 1946 issue of Current Technological Developments prepared by the U. S. Dept. of Labor—Bureau of Labor Statistics.

W. A. E. McLEISH
Division Engineer
Consolidated Paper Corp., Ltd.
Shawinigan Falls, P. Q.

● A copy of "Briton Constructs Novel Permanent Dwellings" has been mailed.—Ed.

● Variations in quality always have a cause. Here is what Transue does to maintain a single, high standard. Each deep drawn stamping job follows fixed plant procedures. Long-practiced teamwork joins the attention of *executives, engineers* and *workmen* on all assignments, large or small. In actual production, exceptionally complete facilities—which include double action presses up to 650 tons, auxiliary presses of many types, pickling, continuous annealing, welding—make possible the handling of each job by the most advanced processes and with the ultimate in mechanical precision. This is your assurance of consistently high quality, uniformly close tolerances, when you specify T & W parts.

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This Industrial Week . . .

- ***Peacetime Controls Create Confusion***
- ***Bartering Takes on Curious Aspects***
- ***Steel Rate Off Half a Point to 90.5***

PRICE and production controls, which were successful in the steel industry during the war, are falling far short of producing a normal and healthy peacetime steel distribution. The proof of this is that one year after the war's end finds the steel industry and its consumers in a state of anxiety neurosis, or maybe more descriptively, postwar slaphappiness.

In the war period output was concentrated on specific products with not too many changes in sizes, shapes and quantities. This production was pushed forward regardless of price or sacrifice. Peacetime economy being a horse of a different color requires all kinds of sizes, shapes, products and a tremendous increase in the number of orders and consumers.

Faced with a shortage of supplies, many customers both large and small have been driven to black markets for some steel items and have been forced to engage in a system of bartering which has become almost fantastic during the past several months. While the steel industry is free from any evidence of black market operations, some firms have been forced to engage in barter operations involving for the most part scrap supplies.

JUST as in other commodities, steel black market operations are difficult to expose because they work undercover, and although the amount of steel being handled by this method is small compared to total steel shipments, it does flourish in many parts of the country. More conducive to upsetting the general scheme of distribution, however, are the bartering methods which some of the smaller steel producers and even the larger ones are required to use in order to get enough material to keep their manufacturing plants or their jobs in operation.

Many consumers have been able to obtain steel products by supplying scrap tonnages to the company furnishing the steel. In some cases tie-in orders have been negotiated whereby in order to get one product, a certain tonnage of another one must be taken.

Carrying the situation to an extreme have been cases where even plumbing contractors have purchased unprepared scrap, passed it through the channels and have been assured such items as bathtubs and other material needed to complete projects.

Another major factor which has upset the proper division of steel supplies has been the necessity for steel companies to concentrate their output on items which show a profit and to cut output on or eliminate production of those items on which the profit is too low or the loss too great. This elimination of products and withdrawal from certain market areas has left a substantial number of steel consumers without a normal source of supply and with little or no inventories.

AN example of this situation is the warehouse industry. Warehouses during the war were the main standby of small manufacturers and a chief support in the balancing of parts or products needed by large consumers. Today the warehouses have been hard hit by the reduction in the output of some steel products and the inability to obtain anywhere near their requirements from their current or former sources.

An important steel product, concrete reinforcing bars, always a main item in almost every large warehouse, is in such short supply today that many construction activities involving roads, utilities, factory buildings and other large undertakings are being definitely threatened. No amount of effort on the part of many warehousemen has produced an increase in steel requirements, but as an actual fact shipments are being cut to the bone in many instances.

Other products in the construction field including plates and structural shapes are becoming tighter in supply with practically all consumers suffering a substantial cut in their quotas. Chief items which building and construction organizations are using in their bartering as a medium of exchange include lumber, nails, soil pipe and certain plumbing fixtures.

While steel shipping and distribution remain in a turmoil, the steel ingot rate continues at a high level. Ingot output this week is down only a half a point to 90.5 pct of rated capacity.

THE scrap situation continues serious, but steel companies are drawing more heavily upon pig iron supplies which for steelmaking purposes were stepped up substantially in July with further improvement in August. A showdown on the scrap price controversy is expected to materialize from the meeting being held this week between OPA and scrap industry representatives. Until something definite comes from such meetings, however, scrap which is being held will be released slowly.

The steel price situation will probably not take on important aspects for many weeks. Judging from past performance of OPA, considerable data will be mulled over before a decision is reached. Despite reports from some quarters of an across-the-board increase in price, present indications are that when the adjustment comes it will involve about seven or eight items, especially those which are not being made today in sufficient quantities to meet demand.

Steel carryovers continue heavy and many consumers can be expected to have their fourth quarter quotas cut substantially in order to make good on delivery promises made some time ago. It is expected that unshipped but promised tonnage will carry over into the first quarter of 1947.

• **LABOR QUESTION**—One of the least known elements in the Detroit labor situation is the amount and temperature of the steam that has been built into the present wage demands. It has been characteristic of UAW(CIO) operation to carefully build up in advance any wage demands that will be made. This has been done in the case of Chrysler. The question is now: Can the steam be turned off, even if Phil Murray requests such action? Most Detroit labor observers think the union will push its wage demands to the limit.

• **HIGH COST SCRAP**—The practice of directing to particular steel producers production scrap sold through dealers and brokers has had the effect of greatly increasing the amount of cross-hauling in the scrap industry. Scrap generated in Detroit which would normally be used there may now be hauled to southern Ohio, or even more distant points. Cleveland scrap which could most economically be melted there may go to Chicago, while Chicago scrap may be shipped to Cleveland to satisfy the demands of a steelmaker who sells steel in the Chicago market. The cost of this practice in terms of freight paid and loss in time is high.

• **ACID SHORT**—Due to strikes in three sulphuric acid plants and increased demand by the fertilizer and oil industries, some steel plants are running far behind on acid receipts. In addition to the general shortage, tank car shipments are averaging twice as long for round trips as they did during the war. Production of acid in the plants still running is not as high as normal. One of the largest manufacturers of acids is buying acid almost anywhere, shipping it into the Chicago area and absorbing the extra freight charges.

• **OIL MISSION**—A mission of British engineers and sales representatives is leaving shortly for a 3 months comprehensive tour of Caribbean oil producing areas. The group will study drilling and refining equipment with a view to expanding British production in these lines. To facilitate increased production the Council of British Manufacturers of Petroleum Equipment has been formed and at the present time consists of over 200 firms who have at some time supplied portions of equipment for oil field use. G. R. Bolsover, director and chief metallurgist of Samuel Fox & Co., a division of United Steel, is heading the mission. British government agencies and the Royal Dutch Shell companies are cooperating in the visit.

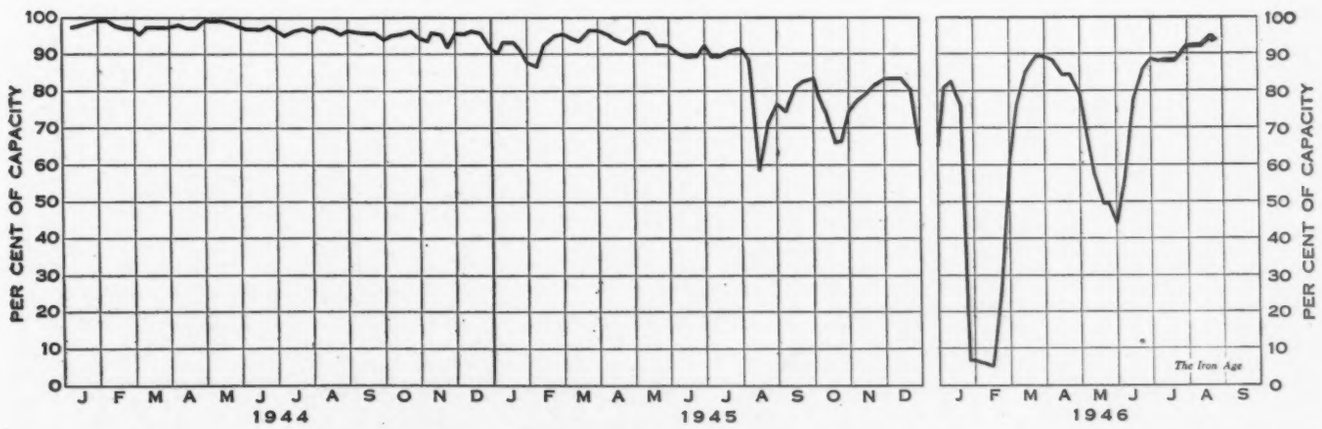
• **NATIONALIZATION PLANS SOFTENED**—Hints that the British Government may decide not to nationalize the U. K. steel industry are being read into the announcement by the Ministry of Supply that the industry control board would not concern itself with public ownership. Significantly, the latest official statement no longer refers to the control board as an interim organization. The original plan called for the board to operate until legislation to assume full control of the industry was completed. With this change in the function of the board members of the British Iron & Steel Federation will be willing to serve on the board. Announcement of names of the members who will serve is expected about Sept. 1.

• **BRITISH PRICE INCREASE**—The British minister of supply has increased maximum prices of steel and pig iron to cover increases in railway rates, coke prices, wages, and other costs. Main qualities of pig iron are increased by from 90¢ to $1.30 per ton, and of heavy steel by $1 per ton. Prices of finished products have been where necessary increased by amounts which reflect the effect of the increases in pig iron and semi-finished steel as well as the increase in direct processing and delivery costs. The same orders also free wrought iron in any form and cemented carbide hard metal tool tips from control. This is the third steel price increase this year, the second on heavy steel products. An increase of $3.30 per ton was announced on Jan. 1.

• **QUALITY NOTE**—Quality is being rigidly maintained by the automobile industry in the face of shortages and spiraling prices for all materials used. But the pressure on purchasing departments and engineering staffs has been terrific. "Deviations" from specifications have been coming along so fast and furious that the chief engineer of one major producer has been required, on an average, to initial a new specification every 20 minutes!

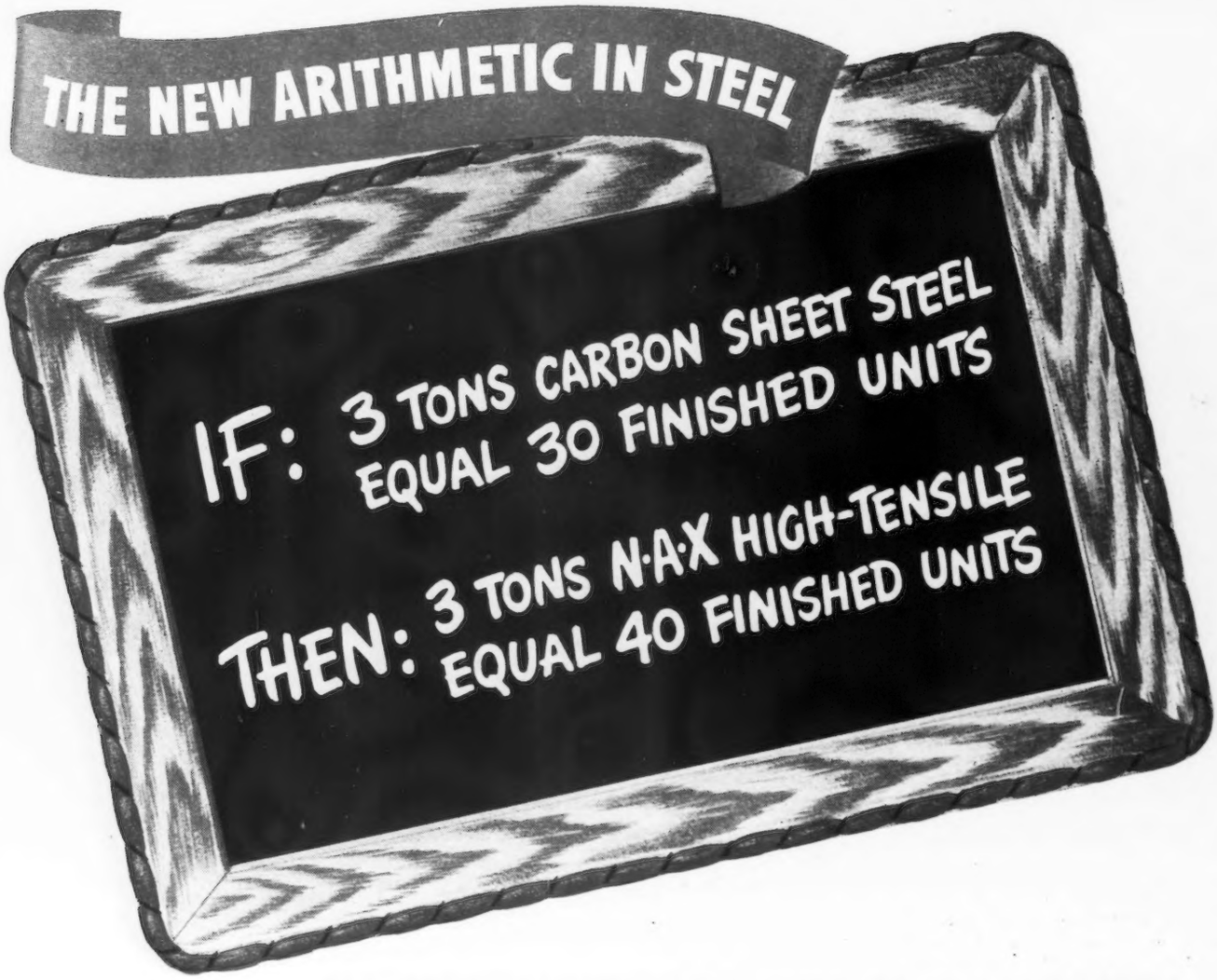
• **SCRAPPED CASTINGS INCREASE**—The scrap and pig iron shortage has caused the percentage of scrapped castings in automotive foundries to skyrocket. In several cases, losses have jumped to 25 pct. Hardest hit by the present situation are producers of motor blocks who have been in serious trouble because pig iron has been practically unobtainable. The Lincoln line closed last week because of failure to receive an adequate supply of motor blocks from a Muskegon source.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
August 20.....	99.0	93.0	87.0*	88.0*	98.0	102.0	95.0	95.0	101.0	71.0	93.0	75.5	89.5	91.0
August 27.....	98.0	93.0	87.0	88.0	94.0	102.0	95.0	95.0	103.0	69.0	91.5	75.5	99.0	90.5

* Revise.


THE NEW ARITHMETIC IN STEEL
IF: 3 TONS CARBON SHEET STEEL EQUAL 30 FINISHED UNITS
THEN: 3 TONS N-A-X HIGH-TENSILE EQUAL 40 FINISHED UNITS

A DEMONSTRABLE FACT: MANY USERS OF HOT AND COLD ROLLED SHEETS CAN INCREASE PRODUCTION OF UNITS 33% BY MAKING 3 TONS OF STEEL DO THE WORK OF 4

These days, the many production advantages of N-A-X HIGH-TENSILE steel are more important and more apparent than ever before.

With this low-alloy, high-tensile steel, you can use lighter sections . . . lighter, but of *equal* strength and *greater* durability. Lighter sections mean less steel per unit, more units per ton. Production of four units for every three units normally produced is a typical result.

Good formability permits N-A-X HIGH-TENSILE to be deep-drawn and formed to intricate shapes. At the same time, its greater corrosion-resistance, excellent weldability, high fatigue-resistance and great impact toughness bring both product improvements and production savings. Many fabricating, finishing and handling operations are simplified or eliminated.

The specific production increases and economies that can be effected in your plant through the use of N-A-X HIGH-TENSILE steel can be determined, of course, only by a study of your particular problems. Our metallurgists and engineers are at your service.

MAKE A TON OF SHEET STEEL GO FARTHER
Specify—
N-A-X
HIGH-TENSILE STEEL

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Shortage of Parts Taxes Ingenuity of Automakers

South Bend, Ind.

• • • **The parts** bottleneck, well worn bromide of World War days, still plagues industry despite the best efforts of war-trained purchasing agents and their expediters. Each day at 1 p.m. P. O. Peterson, director of purchases for Studebaker Corp. finds a memorandum on his desk listing certain items to be used in the production of Studebaker cars and trucks which are in seriously short supply.

One day last week the list contained 18 items. If deliveries of these items had not been made to South Bend within the following 24 hr Studebaker assembly lines would have had to close down.

The following items were seriously short on Aug. 15: Front fender grille panel-to-fender bolts; front fender air intake side panel silencers; shims; steering post collars; tail and stop lamp assembly; wheel assembly; truck radiator grille panels; truck steering gear assembly; truck post jacket and bearing assembly; truck rear axle assembly; truck differentials; heater assembly; sun visor assembly; lift channels; door winder regulators; fuse blocks; cowl top and roof panels.

This was not an unusual day for Studebaker; every day several items are on the list and as many as 35 parts have been included in the report for a single day.

The ramifications of the tight materials situation are not immediately apparent, especially to prospective car buyers who are waiting for a new car. Yet they offer a ready explanation as to why automobile production remains at low levels, why production costs are steadily pyramiding; and why men close to the automobile industry are unwilling to predict a substantial increase in automobile output in the months immediately ahead.

It should be explained that Studebaker's experience in the automobile industry is not exceptional insofar as material and parts shortages and transportation charges are concerned; all producers are having similar difficulties. However, the fact that Studebaker has had no strikes in its own plants, that its labor relations and labor productivity are at least as favorable (if they do not surpass that of any other producer), and that its relations with suppliers continue to be excellent, permits no objection that Studebaker's position is less favorable than that of some other automobile producers. Indeed, Studebaker's position with respect to suppliers and labor is probably the most favorable in the entire industry. What then is Studebaker's production record?

WALTER G. PATTON
Detroit Regional Editor

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In a recent letter to Walter Reuther, president of UAW-CIO, Paul G. Hoffman, president of Studebaker Corp. gave the following overall production picture:

"From Oct. 1, 1945 when we were scheduled to resume production of passenger cars to June 30, 1946 Studebaker produced approximately 43,000 passenger cars and trucks as against a scheduled production for the period of 134,500 units.

"Our failure to attain scheduled production was due almost entirely to strikes and slowdowns in plants of suppliers. . . .

"A clear picture of what has happened to us can best be had from the following compilation which shows our scheduled production and actual production, of passenger cars since Oct. 1, 1945."

Month	Production		Actual as pct of Scheduled Output
	Scheduled	Actual	
October	3,000	6	0.2
November	6,000	.....	.....
December	10,000	1,309	13.1
January	7,500	7,506	100.0
February	13,000	9,048	69.5
March	20,000	7,852	39.5
April	25,000	3,026	12.1
May	25,000	4,570	18.3
June	25,000	9,692	38.8
	134,500	43,011	32.0

In his letter to Reuther, Hoffman listed 28 strikes between Aug. 14, 1945 and July 30, 1946 each of which stopped production of parts in plants not owned by Studebaker. In the accompanying chart each strike has been identified as to the part involved and the time and duration of the strike. Strikes which were continuing simultaneously are evident from the chart. It will be seen that Studebaker has not been entirely free from the back-wash of strikes since last August and that many of the stoppages affecting Studebaker production were of long duration.

The fact that a strike was in progress does not mean that all Studebaker sources of supply were immediately cut off. However, in each case a major source of supply was temporarily eliminated, and in many cases the closed supplier was furnishing the bulk of Studebaker's requirements.

The true significance of the unbalanced inventories, critical shortages and delays resulting from interruptions in the flow of supplies to Studebaker plants can best be appreciated by examining a few of the steps the company was forced to take to keep its assembly lines rolling.

For example, when wheel locking rims became short, the Studebaker purchasing dept. was able to locate 11,025 in a WAA warehouse in Nebraska. The rings in storage were painted olive drab. It was necessary to fly the parts to South Bend, strip off the paint, galvanize and then refinish the parts before they could be used. The finished cost of the parts was much higher than parts furnished by a regular source, but production lines were kept going because this step was taken.

When radiator cores became scarce a supplier agreed to transfer tubing originally set aside for another purpose and make the material available for automobile production.

In the case of a supplier of fender sheet, having a capacity of 30,000 tons per month, production was set for 24,000 tons. Actual production was only 16,000 tons principally because of a slowdown in the pickling line. When this condition was remedied a breakdown in power supply made it impossible to run more than one slab at a time; ordinarily three slabs are processed simultaneously on this mill. Studebaker's supply of fender sheets was cut proportionally.

In the case of cushion springs,

both of the principal sources were shut off, one as the result of a strike, another because of a wire shortage. The struck plant was closed for seven weeks. When production was resumed, a labor shortage developed and the supplier was able to furnish only subassemblies. These are now being assembled in South Bend in an attempt to maintain an adequate supply of seat cushions.

Rubber door seals and hardware are currently being delivered to South Bend using chartered planes, air express, railway express, trucks and individually driven passenger cars. The cost of air express for a single shipment from Toledo is $95.00. The cost of using an entire express car may sometimes equal the value of the parts to be delivered.

It is almost a daily occurrence for Studebaker to ship steel to a supplier who is about to be shut down for lack of this material. Such diversions of steel or other materials to suppliers are commonplace among automobile producers today and are possible only because present car production is far below expectations. Such relief to suppliers would hardly be possible if automobile output had even approached expectations; the practice would be clearly impossible during a period when production sights are constantly being raised.

Bumper shortages have been a headache to all automobile producers, and Studebaker is no exception. Strikes and materials shortages in the plants of suppliers have been major factors, but there have been other contributing conditions. During the war many chromium plating shops were closed and there has not been sufficient time to train new personnel. Another factor has been excessive die breakage which has been variously attributed to nonuniformity of steel, inexpert and careless operation of presses and inferior die blocks. For an extended period Studebaker was forced to use two front bumpers on passenger cars; the rear bumper was replaced at a later date. Approximately 2000 cars have been built without standard sets of bumpers.

A classical example of modern expediting procedure occurred in the case of rear axle assemblies for Studebaker. Axles were being furnished by Supplier A; ring gears and pinions were furnished by Supplier B. When the axle supply dried up, Studebaker furnished steel and arranged for hammer time with Forge Shop C, contracted for delivery of ring gears and pinions to this shop and then arranged for a man to "live with the job" and supervise the assembly as well as shipment by express to South Bend.

In the case of molded rubber products used on front door weatherstrips, Studebaker bought two sets of molds as a protection measure. One supplier was closed by strike for 14 weeks. The second set of molds happened to be in Chicago when the power holiday and 24-hr work week was ordered. After obtaining a court injunction to get possession, the molds were hurriedly shipped to an Akron rubber company which, after three breakdowns, began sending the weatherstrip by airplane, bus and truck to South Bend.

An automotive parts shortage may sometimes uncover some remarkable coincidences of supply. For example, one supplier which furnishes Studebaker directional signal lamps was unable to obtain switches from its normal source. The scarcity in switches resulted from a wire shortage at a firm which deals direct with Studebaker in another item. By working together the problem was solved whereas if all the firms affected had not been able to get together it is doubtful if a solution could have been found.

Another annoying experience is to be forced, as by the current hardware shortage, to put on door handles after the car has come down the assembly line. On other occasions a necessary part—like a two-speed axle—may not be available. When this happens this particular model must be pulled off the line until supplies again are on hand.

While automobile producers may occasionally have a surplus of a few steel items they are generally fighting for steel, never knowing when their own production schedules will be raised or suppliers are going to call on them for help. What often happens, of course, is that an item included in June rolling schedules may be set back to August and, if luck holds out, be delivered in September. This has happened frequently in recent months. Now with priorities being given to certain housing and agricultural items by CPA even more frequent disappointments appear to be in prospect for the months just ahead.

Transportation breakdowns may also tie-up automobile production lines and Studebaker has recently had several experiences that illustrate this point rather well. A shipment of badly needed propeller shafts was scheduled to leave Pottstown by railway express. At the last minute this arrangement was changed and the shafts were turned over to a trucking company. This shipment was "lost" in transit. Despite the combined efforts of Pennsylvania, Ohio and Indiana State Police the shipment was not located until ten days later—just ten miles out of Pottstown. The trailer had been ditched and police are still looking for the driver and tractor.

Transportation interruptions can also turn out favorably. For example, a recent shipment of critical parts missed connections in Cleveland, but made the next train. Meanwhile, the first train was wrecked and had 29 coal cars strewn in its path. The second train got through, however, and with only slight delay. Thus a production interruption was avoided by the narrowest of margins. On another occasion involving a train wreck, a temporary rail line was laid across a cornfield and much needed parts were delivered to South Bend only two days behind schedule.

The net effect of all these special activities to keep production going is reflected in the Studebaker purchasing dept. In December 1940 when production was considerable higher than it is today there were 98 persons employed in this department; today, there are 134. Whereas invoices used to be received weekly or monthly, they are now being received and processed almost daily. Obviously this adds considerably to the cost of doing business.

Studebaker's purchasing dept. today is largely an organization of expediters. More time and effort is expended to keep supplies flowing now than at any time during World War II.

Before the war all members of the Studebaker purchasing dept. remained in South Bend and made only occasional trips to suppliers' plants. Today three staff members are constantly on the road while others spend at least one-fourth their time in suppliers plants mak-

ing arrangements to maintain a proper flow of materials. Nine automobiles are kept in readiness at South Bend to dash to suppliers' plants when necessary; and three of these cars are in almost constant service.

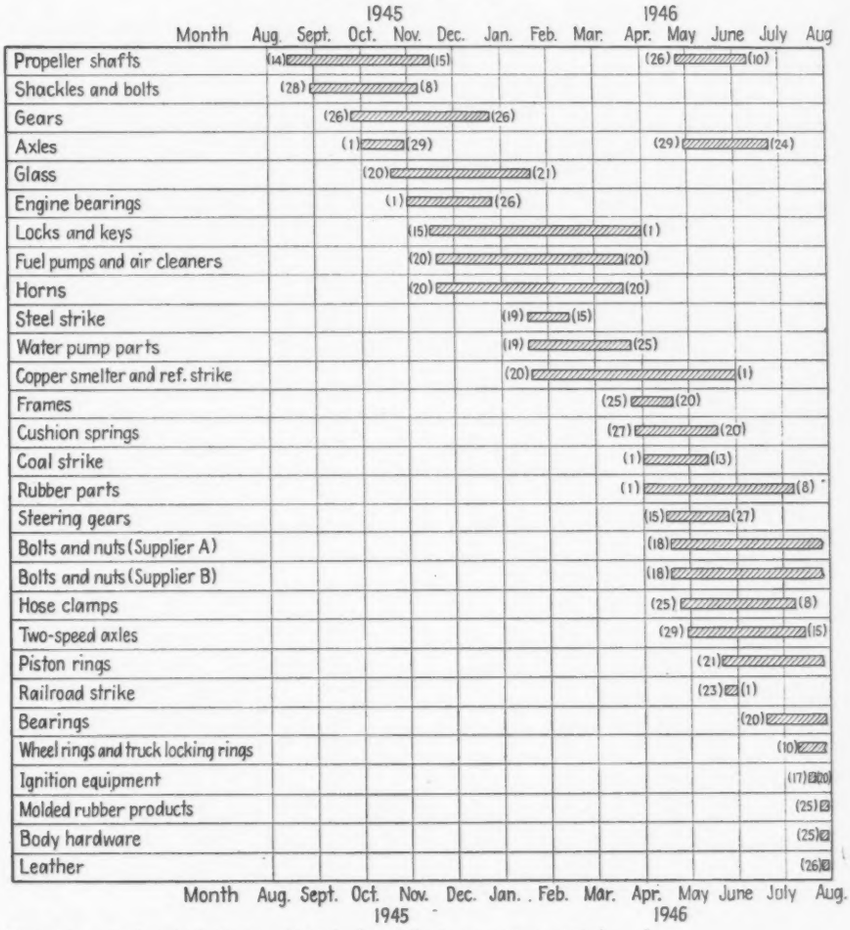
Normal practice in any automobile plant is to maintain minimum inventories at all times. The number of day's supply kept on hand naturally varies with the investment involved, the size of the part and delivery schedules. Prior to World War II, tires for example were unloaded directly from freight cars to assembly lines thus eliminating unnecessary materials handling and storage charges. This practice was followed in the case of other bulky parts. Today, such practices in the interest of economy are seldom possible. The former practice of keeping three-week supply of body items and hub caps, a 10-day supply of steering wheels and 8-10 day supply of gears on hand has almost vanished with today's frantic efforts to maintain balanced supplies of parts.

Supply problems current and in the future, which confront Studebaker could be cited almost endlessly. Pig iron has been and continues to be critical. It is now reported that there is on hand in this country only 35 pct of the lead required for U. S. battery producers assuming the entire national supply could be used for batteries only.

One of the most vexing shortages is upsetting wire for bolts, screws and certain types of fasteners. Temporary relief from this problem has been obtained by purchasing cold finished bars and producing these items on screw machines. A recent diversion of ingots in one of the larger mills from wire rope to spring wire should help to alleviate the spring shortage although this item will undoubtedly be tight for several months ahead.

In view of Studebaker's experience—which is being duplicated throughout the automobile industry—it is fair to say that in the production of automobiles today there is never a dull moment.

SUPPLIERS STRIKES AFFECTING PRODUCTION OF STUDEBAKER CORP.
AUG. 1945 TO JULY 26, 1946


1945
1946
Month Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug
Propeller shafts (14) (15) (26) (10)
Shackles and bolts (28) (8)
Gears (26) (26)
Axles (1) (29) (29) (24)
Glass (20) (21)
Engine bearings (1) (26)
Locks and keys (15) (1)
Fuel pumps and air cleaners (20) (20)
Horns (20) (20)
Steel strike (19) (15)
Water pump parts (19) (25)
Copper smelter and ref. strike (20) (1)
Frames (25) (20)
Cushion springs (27) (20)
Coal strike (1) (13)
Rubber parts (1) (8)
Steering gears (15) (27)
Bolts and nuts (Supplier A) (18)
Bolts and nuts (Supplier B) (18)
Hose clamps (25) (8)
Two-speed axles (29) (15)
Piston rings (21)
Railroad strike (23) (1)
Bearings (20)
Wheel rings and truck locking rings (10)
Ignition equipment (17) (20)
Molded rubber products (25)
Body hardware (25)
Leather (26)
Month Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug.
1945
1946

Figures in parenthesis indicate day of month when strike began and was settled

Colonel Johnson Urges Prompt Unloadings To Increase Available Cars

Washington

• • • **Shipping facilities could** be increased by 9 pct or about 80,000 freight cars a week if the turnaround time were further reduced from the present average of 13.7 days to the June 1941 prewar average of 12.5, according to Col. J. Monroe Johnson, transportation director.

The statement was made in connection with his response to appeals for the routing of more cars and railway equipment for grain and grain products in western areas. Further diversion for this purpose, he said, would have "disruptive effects" on the nation's economy by stepping up empty mileage and slowing down movement of raw materials and finished products.

Iron and steel, coal and foundry sand for making steel and iron castings were specifically named by Col. Johnson as basic products which must be kept moving.

Revises Vacation Rules

Detroit

• • • **Ford Motor Co.** is revising its vacation eligibility rules for hourly-rated employes to give credit for prewar service to those who were laid off when civilian production was halted.

The decision to revise the rules affects those laid off who either were not called back to work or were prevented from returning by War Manpower Commission regulations, according to an announcement by John S. Bugas, vice-president in charge of industrial relations. The change in rules will result in approximately $600,000 increase in vacation benefits and goes somewhat beyond a request made by UAW-CIO, bargaining agent for most of the employes affected.

OPA Announces Strict Procedure for Decontrol Action

Washington

• • • **OPA's procedures** for decontrol of non-agricultural commodities bear out OPA Chief Paul Porter's earlier statements that the new price control law would be rigidly adhered to in arriving at future price determinations.

Procedural Regulation 17, effective Aug. 23, makes it quite clear that industry will have to prove that the commodities it produces meet the standards contained in the law before OPA will consider petitions for decontrol.

Industry petitions will be handled by a newly-created Decontrol Div., headed by John Bulkley, assistant deputy administrator for decontrol.

Only procedure for petitioning for decontrol on grounds of the balance of supply and demand have been provided in the new regulation. Before Dec. 31, 1946, there is no provision for industry advisory committee action to institute decontrol of items solely because of their unimportance to business or living costs. OPA is charged with the responsibility to clear off the dockets by that date every item except those it finds to be important in relation to business or living costs. Before that date, decontrol on that basis is left wholly up to OPA, according to the announcement accompanying the regulation. After Dec. 31, industry committees may petition for removal of price controls from any additional items they consider unimportant. Informal advice on their views may be given at any time.

In general, this is the procedure established by the new regulation:

(1) Committees must file a formal petition for decontrol. The committee must show, in its petition, its reasons for thinking the existing supply demand relationship of the commodity in question warrants decontrol. A simple statement that supply and demand are in balance will not be sufficient, says OPA. The procedure established requires the request to be supported by a thorough analysis of current production and its relation to demand, together with substantiating evidence to support this analysis. Suggested as evidence are such data as: Well-grounded estimates of demand at all levels of distribution; industry surveys of current production made by trade groups or research organizations of a representative sample of firms; surveys of raw material and labor supplies and geographical distribution, and any other statistical information available.

In determining whether production matches demand, OPA says the tests would be: Can those who buy the commodity for their own use at existing ceiling prices do so with the same facility and width of choice they had before the development of wartime pressures and is this a purely fleeting condition or is there reasonable likelihood that it will continue?

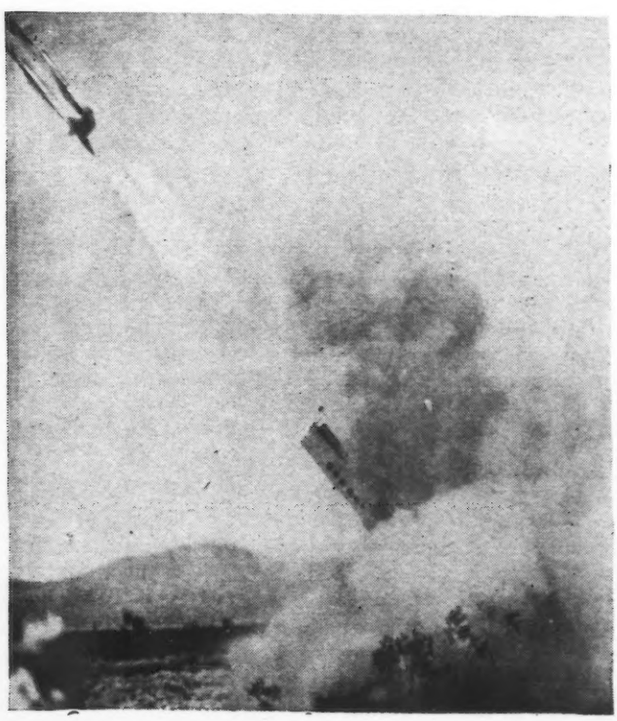
Since comparison with prewar buying conditions is essential to the determination, parallel data for a typical prewar year (1941 is suggested) is also asked for. This should be supplied for exactly the same selling period as the current data.

(2) Within 15 days after receipt of the petition, OPA will either tell the committee that decontrol of the item has been approved, or give its reason why the standards of decontrol have not been met. If the petition is not in proper form it will be dismissed. In this case, the committee can file a new petition. Groups may also send in further information after their petition is on file, but this will be treated as a new petition.

(3) If a request for decontrol is not granted in full, the industry committee may request a formal hearing. This hearing will be held within 10 days of the receipt of the request. Here industry members will be given an opportunity to present their arguments for decontrol. Also, the Consumer and Labor Advisory Committees of OPA will be notified, so they can present evidence on behalf of consumers and labor. Again, the decision must be given in 15 days. If it is adverse, OPA must cite the economic data or other facts on which the denial is based.

(4) The Price Decontrol Board is the final tribunal in case decontrol is refused by OPA after both a petition and a hearing. The industry may present its petition to the Board for review or a rehearing.

OPA also pointed out that the above lists of types of evidence represent only minimum requirements. Additional data, if presented, will greatly aid the determination.



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AA ROCKET: *This radio-controlled anti-aircraft missile was powered by a jet assisted take off, solid fuel rocket during military tests in the Mojave Desert recently. It is normally launched from shipboard catapult with the aid of four standard rockets.*

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CPA Again Looks to Possibility Of Subsidizing Marginal Blast Furnaces

Washington

• • • **In view of the** determined stand by OPA against any further increase in pig iron prices, attention of CPA has again turned to the possibility of subsidizing marginal furnaces. The agency has under consideration also the use of subsidies to absorb high freight rates in order to bring about a freer movement of pig iron.

In the meantime, reductions in August allocations of pig iron, made in order to lessen the impact of the housing, farm machinery and railroad brake shoe programs on other industries, are likely to be carried over through September. This was indicated by CPA at the recent meeting of the Malleable Iron Industry Advisory Committee. September allocations were then undergoing a review, agency officials said.

A recommendation was made by the committee that the CPA limit allocations for pig iron for housing items to 25 pct of total production in any one month or quarter. The group also urged that the NHA take speedy action on a recommendation made in July that the use of cast iron soil pipe be limited to that allowed under former order M126, including prohibition of its use beyond five feet outside a house.

Pointing out that its industry supplies castings for about 18,000 of the 28,000 American-made components listed by WPB during the war, committee members declared that production of many of these items are suffering because of heavy allocations of pig iron to production of the housing and farm machinery items and brake shoes.

Foundrymen were urged to check certifications immediately because of reports that some foundrys had accepted self-certified orders which did not use the legal certification form. Use of an illegally certified order as a basis for obtaining pig iron is as much a violation as placing the order.

For the first six months of 1946, the agency reported, shipments of malleable iron castings averaged 56,000 net tons a month as compared with a goal of 90,000.

At the same time, the Gray Iron Foundry Industry Advisory Committee has made substantially the same recommendations to CPA including subsidies of higher prices for pig iron or both.

It was emphasized that pig iron shortages have already closed some gray iron foundries while the output of many others has been materially reduced. Although the indicated capacity of the industry's 2000 foundries is approximately 1,350,000 tons a month, reported June shipments amounted to around 737,000 tons—about half the rated capacity and the lowest output in five years.

Adding to the gravity of the situation, CPA officials said, while reopening of all closed blast furnaces would add about 35 pct to the current merchant pig iron production, the coke supply for full operation is adequate only in the South. Coke for reopened northern furnaces would have to be balanced by cuts in other consumption.

Other recommendations by the gray iron advisory committee included an increase in scrap prices and the segregation of scrap into mill and foundry grades with the latter earmarked for the foundries.

OPA Increases Beehive Coke Prices; Makes Other Ceiling Changes

Washington

• • • **Maximum prices** for beehive oven coke produced in the Connellsville District of Pennsylvania have been increased $1.35 per net ton for hand drawn coke and $1.25 per net ton for machine drawn coke, OPA has announced.

Effective Aug. 22, the action affects all beehive oven coke produced in that district, which accounts for about 85 pct of total production.

OPA said that because the increases are based upon average costs and cost increases, some producers will get a margin smaller than the average and others, due to high production costs, will be unable to recover total costs. However, such producers may apply for individual adjustments.

Distributors who buy beehive oven coke at or for delivery from an oven plant and resell it in not less than cargo or railroad carload lots without physically handling it may add to their acquisition costs their Mar. 31, 1946, percentage mark-up.

However, this applies only to beehive oven coke produced in the Connellsville District and other than foundry coke produced in Fayette and Nicholas counties, West Virginia.

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Washington

• • • **Manufacturers** of dairy machinery and equipment have been given an industry-wide nine pct increase over base date price ceilings which replaces the eight pct interim advance effective since June 10, according to OPA. It is effective as of Aug. 23.

At the same time, OPA authorized resellers of these products, who were formerly required to absorb part of the interim price advance, to pass on the full percentage amount of their suppliers' increase.

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Washington

• • • **Resellers of** armored cable have been granted a percentage pass-on of two general increases granted manufacturers of armored cable on May 8 and June 14, averaging 27 pct, OPA has announced.

Effective Aug. 23, the new resellers' prices for armored cable are provided in mark-ups over manufacturers' selling prices of 18 pct for two conductor, size 14, solid wire and 21 pct for other types of armored cable reflecting the percentage pass-on required, OPA said.

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Washington

• • • **Maximum prices** for warm air furnaces (24 inches and smaller), have been raised by 10 pct over the June 30 price ceiling, effective Aug. 28, OPA announced.

With the previous increase granted manufacturers on Apr. 19, this action brings prices for warm air furnaces (24 inches and smaller), on an average 31.7 pct over Mar. 1942 prices, the agency said.

The increase is the minimum required by law and resellers are permitted to increase their maximum prices in existence on Mar. 31, 1946, by the same percentage.

OPA Revises Export Price Rules; Plans Meeting to Answer Questions

New York

• • • **Exporters will** find it simpler to compute their ceiling prices as a result of a revision of the export price regulation, the Office of Price Administration has announced.

The revision, effective Aug. 23, 1946, while facilitating pricing by exporters, makes no change in OPA's export price policy. This policy is designed to prevent higher prices in foreign markets from draining goods from the price-controlled American market.

Producer-exporters who have previously filed ceilings with OPA which have been approved may continue to use such ceilings or, at their option, may use the revised method of applying individual pricing experience in computing their mark-up. All other exporters are required to calculate their ceilings by the revised method.

OPA pointed out that all commodities exempt from price control when sold domestically are exempt from price control when exported. Also exempt are sales of (1) imported commodities entered through customs for exportation or stored in transit in a free zone; (2) commodities processed in bond exclusively from imported materials, and (3) commodities manufactured from imported textiles or metals if the exported commodity contains not less than 90 per cent by weight of the imported materials and the importer makes a declaration of drawback and files a statement with OPA of intention to export.

A meeting of exporters will be held Sept. 5 in New York City, at which Harold V. Webber, Chief of the Office of Export-Import, and Robert H. Frazier, Chief Counsel of the Office of Export-Import, will explain the revisions in the regulation and answer questions. The meeting, open to all exporters, will be at 2 p. m. in the assembly room of the Commerce and Industry Association of New York, Woolworth Building.

Export ceiling prices continue to be calculated on the basis of the domestic prices, plus actual export expenses and a mark-up if one was used prior to 1940. Under the revised regulation, however, exporters will be able to use an export mark-up based on their own individual average during any 6-months or 12-months period between Jan. 1, 1939, and Dec. 31, 1940, instead of using the average in the trade. If an exporter made no sales between those dates, he is permitted to use his average mark-up during the nearest 12-month period before Jan. 1, 1939, in which he made sales. Specific export mark-ups are also set out in the revised regulation which new exporters are required to use and the others may use at their option. Those producer-exporters who did not have a mark-up prior to 1940 are now allowed a 3-pct mark-up to cover increased costs of operation, whereas previously no mark-up was allowed them.

Merchant-exporters who buy commodities and sell them abroad, and producer-exporters who manufacture commodities and sell them for export, are more clearly defined in the revised regulation. It also defines distinctly the difference between a sale for export where one sells the commodity for later sale abroad by someone else, and an export sale where one directly sells the commodity abroad.

Ordinary sales to purchasing missions of foreign governments will no longer be considered as export sales, and export mark-ups are not allowed on such sales except in the case of flour and grains.

Minimum functions that must be performed by an exporter in order to qualify for an export mark-up are specified. Specific formulas have been provided for determining ceiling prices on exports of bituminous coal, iron and steel, and relaying rails.

Among the many provisions made more specific is one that definitely specifies the allowable export expenses. In this connection, exporters may apply for permission to add a percentage to the basic domestic price to cover export packing expenses on all shipments. The percentage would be equivalent to the estimated actual expenses on such shipments.

A number of provisions for adjustments in prices are set out that will allow more flexible operation of the regulation.

Blast Furnace Capacity and Production—Net Tons
Source American Iron & Steel Institute

	Number of Companies	Annual Blast Furnace Capacity	PRODUCTION							
			PIG IRON		FERRO-MANGANESE AND SPIEGEL		TOTAL			
									Pct of Capacity	
			July	Year to Date	July	Year to Date	July	Year to Date	July	Year to Date
DISBRIBUTION BY DISTRICTS:										
Eastern	12	12,988,970	833,991	4,092,674	29,262	118,708	863,243	4,211,382	78.4	55.8
Pittsburgh-Youngstown	16	25,939,940	1,878,364	8,559,369	19,034	68,792	1,897,448	8,628,161	86.3	57.3
Cleveland-Detroit	7	6,557,500	433,488	2,527,756			433,498	2,527,756	87.0	66.4
Chicago	7	14,093,510	1,010,336	4,819,447			1,010,336	4,819,447	84.6	58.9
Southern	9	4,924,670	330,640	1,649,964	6,889	53,976	337,529	1,702,940	80.9	59.5
Western	5	2,836,000	113,233	622,412			113,233	622,412	47.1	37.8
TOTAL	37	67,340,590	4,650,042	22,270,622	55,235	241,476	4,705,277	22,512,098	82.4	57.5

Weekly Gallup Polls . . .

American People Would Prefer a Strong UN

Princeton, N. J.

• • • **The quarrels and** bickerings among the world's leading nations, which have beset the Paris peace conference, are not making the average American turn isolationist, according to George Gallup, director, American Institute of Public Opinion.

While a majority of people express dissatisfaction with the progress of the United Nations so far, the country continues to have faith in that world organization and, in fact, wants the charter of the UN strengthened to give it more power.

As a test of just how far the people are willing to go in the direction of a world government, the institute sought the country's views on giving the UN control of the armed forces of all nations, including those of the United States.

Some leaders have urged this step on the grounds that only when control of war-making powers is invested in international hands can the world look for permanent peace. Such a step is, however, opposed by others who say that it would mean giving up one of the oldest sovereign rights of national government, the power to wage war.

The question was put as follows in the poll:

"Do you think the United Nations organization should be strengthened to make it a world government with power to control the armed forces of all nations, including the United States?"

The vote shows that those favoring the idea outnumber those opposed in the ratio of more than 2 to 1.

	Pct
Yes	54
No	24
No opinion	22

Fear of another war is undoubtedly a major reason for the favorable vote. A recent survey by the institute found that 65 pct of the country's voters are afraid there will be another world conflict within 25 yr.

It is worth noting that the Midwestern section of the country—the area once supposed to be isolationist in its sentiments—today shows just as large a majority for strengthening the UN as any other section.

Within recent months two Midwestern political leaders who have often been called isolationists were re-elected—Sen. Hugh Butler in Nebraska and Sen. William Langer in North Dakota. On the other hand, three Midwest isolationists, Sen. Robert LaFollette of Wisconsin, Sen. Henrik Shipstead of Minnesota, and Gerald P. Nye, who was seeking a political comeback in North Dakota, were defeated.

This confusing picture has led to much speculation as to whether the voters of the Midwest (East Central and West Central states) are, or are not, returning to isolationism.

The vote in today's poll would seem to indicate that they are not.

The geographical vote follows:

	On Increased Power for UN Yes Pct	No Pct	No opinion Pct
N. Eng. & M. Atl...	51	21	28
E. Cent. & W. Cent.	56	26	18
South	56	22	22
Far West	57	25	18

A substantial majority in favor of the idea is likewise found among the nation's prominent men and women who are listed in "Who's Who in America."

A special survey among a cross-section of that group was conducted by the institute on the same question as was put to the general public. The "Who's Who" vote follows:

	Pct
Yes, favor increased power for UN	59
No	32
No opinion	9

The "Who's Who" vote closely parallels that found among voters who have had college training. The vote by education groups follows:

	Yes Pct	No Pct	No opinion Pct
College	58	31	11
High school	53	28	19
Grade or no school	53	20	27

Would Give UN Control Over Armed Forces of Members To Prevent Another World War

o o o

• • • **The diplomatic running** battle between the United States and Russia is having a marked effect on American ideas as to how we should handle Russia.

There has been an increase in the number of people who think that in handling the Soviets we should follow a firm line—no appeasement, make Russia live up to her agreements, maintain substantial American military strength as a precaution against the future.

The average American feels that Russia is not merely trying to protect its borders but is actively out to attempt to dominate the world.

To test the country's attitude toward Russia the institute put a series of questions to a true cross-section of the voting public as follows:

"In general do you approve or disapprove of the policy Russia is following in world affairs?"

This same question was asked in a poll in March. In both surveys 71 pct expressed disapproval, 7 pct approval and 22 pct expressed no opinion.

Next the voters were asked:

"As you hear and read about Russia these days, do you believe Russia is trying to build herself up to be the ruling power of the world, or is Russia just building up protection against being attacked in another war?"

The vote today as compared to a similar poll in June:

	Today Pct	June Pct
Wants to be ruling power	60	58
Only seeking protection	26	29
No opinion	14	13

The third question in the survey was one on which the nation had been polled in March.

"If Russia continues to follow her present course, what should we do, if anything?"

The latest findings may be sum-

(CONTINUED ON PAGE 131)

Plastic Film Assures Safe Storage and Shipment of Machinery

Camden, N. J.

• • • **A new technique** in the preservation of industrial equipment from moisture and corrosion during an inactive period has been evolved from the Navy's developments along these lines for the inactivation and decommissioning of warships. By the application of a modified combination of film forming vinyl resins contained in volatile solvents by means of conventional paint spraying equipment it is possible to withdraw from service for future use parts, assemblies or complete machines without special preparation such as the application of cosmoline grease.

The developer and marketer of the new preservative technique is the R. M. Hollingshead Corp., Camden, N. J., who has worked out new formulas for plastic packaging which are reported to have cut down on the time required for application and to have extended the life expectancy of the moisture barrier under adverse service conditions. Application is said to be 70 pct faster than the plastic package covered by Navy Specification OS 3602. One machine which required 30.5 man-hr with the Navy formula can now be packaged in 10 man-hr.

For long term outdoor storage, 5 to 30 yr, Hollingshead recommends the application of a spray coat of Insul-Mastic, a gilsonite-base material that bonds well with the vinyl resin. A top coating of aluminum is recommended for all packages in order to protect against the actinic rays of the sun and to minimize variations of temperature within the package and thus cut down the moisture that must be adsorbed by the desiccant, usually silica gel, placed within the package.

The process is expected to be useful for long term storage of equipment such as machine tools, precision instruments and gages, electrical equipment, oil field equipment, farm equipment and many other fields. It should be useful in transportation and export of machinery, particularly to tropical countries. A significant advantage is the speed with which stored equipment can be returned to service merely by cutting open the package with a knife to find the machinery containing its normal operating lubricant ready to go into production at once.

The R. M. Hollingshead Corp. is prepared to market its vinyl resin packaging product on a price-per-gallon basis and to furnish technical assistance and personnel to industries working out the proper application techniques. The company is an old established producer of maintenance chemicals for automotive, home, industrial and aviation use and maintains its own canmaking plant, rubber mills

APPLICATION OF COCOON: *Webbing coat of moisture barrier package is being applied to industrial machine. Sprayed threads act to bridge over spaces between applied tapes.*

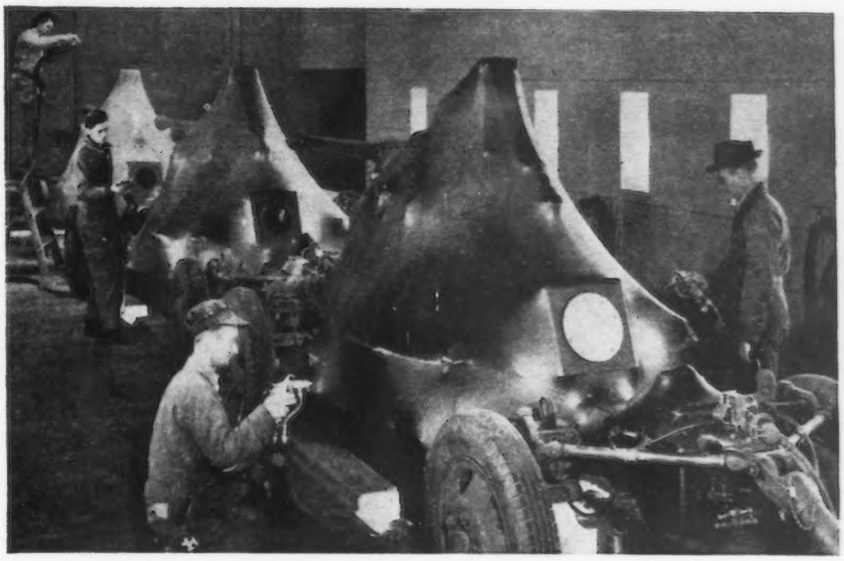
o o o

EXPORT TO CHINA: *Inspecting packaged machine tool for shipment to China where it is to be used for aircraft production.*

For details of the Navy's corrosion protection program, see The Navy Develops a New Corrosion-Protection Technique, THE IRON AGE, *Apr.* 18, 1946, *p.* 104.

and printing department. The new product, which it has tradenamed Cocoon, has been the responsibility of Dr. William H. Holst and G. Russell Hersam who were active in the Navy's development of the packaging technique during the war.

The first spray coat to be applied contains a webbing agent which serves to bridge the approximately 20 in. squares made by the adhesive or scotch tape applied vertically and horizontally to the equipment as a basis for the package. Subsequent spray coats of the plastic without the webbing agent form a strong, elastic moisture barrier whose degree of effectiveness is dependent on its thickness, or the number of coats applied. The moisture vapor transmission rates at 100° F. and 95 pct relative humidity per 24 hr period are as follows: 0.02 in. thick, 0.350 g per 100 sq in.; 0.03 in. thick, 0.235 g per 100 sq in.; 0.04 in. thick, 0.175 g per 100 sq in. Tests on No. 4010 gilsonite Insul-Mastic by the Forest Products Laboratory of the Dept. of Agriculture indicate a moisture vapor transmission rate of 0.01 g per 100 sq in. per 24 hr when sprayed on muslin, 0.06 g per 100 sq in. when sprayed on paper.



FOR OUTDOOR STORAGE: *Application of Cocoons to 40 anti-aircraft guns for long term outdoor storage.*

The tensile strength of the sprayed plastic package is 1750 psi to 2000 psi. The elasticity of cocoon coatings is such that they can be stretched to over three times their original length before breaking. They are said not to become tacky at 180° F and to remain flexible at sub-zero temperatures. They have excellent resistance to acids, alkalies, aliphatic hydrocarbons, oils, fats, greases, alcohol and salt spray. Although the packaging operations must be carried on without the presence of sparks or open flames, the finished product is not readily flammable. The Cocoon package is said not to be attacked by major mildew or mold groups.

New Ore Bridges Near Completion in Ohio

Youngstown

• • • **The first** of two new ore bridges is rapidly nearing completion at the Campbell plant of Youngstown Sheet and Tube Co. Both bridges will be in operation before the end of the year, replacing units which have been in service for over 30 yr.

Designed, built and erected by Heyl-Patterson Co. the new spans will handle nearly twice the load of the present bridges. Each will weigh 850 tons without trolley and 960 tons with trolley. Each is designed for a live load of 135 tons, which includes trolley, bucket and ore load of 20 net tons. The present ore bridges handle 10 gross tons.

The new bridges will be 7 ft. higher than the old spans, which will allow increasing the ore yard capacity 80,000 tons. Each bridge will have a clear span of 244 ft. Trolley travel will be 302 ft, and the distance from the top of the trolley rails to the bottom of the ore yard will be 104 ft. A new feature is a 60-ton loading hopper in the pier leg to facilitate loading the transfer car and to eliminate spillage on the high line trestle.

The present east bridge was originally built in 1908. It was blown over in 1917, during the first World War, and rebuilt immediately. The west bridge was built in 1910. These spans, which will be dismantled, weigh approximately 500 tons with trolley, or a little more than half the weight of the new bridges.

Continuous Seamless Pipe Mill Developed By National Tube Co.

Lorain, Ohio

• • • **Developed by National** Tube Co. engineers, the world's first continuous seamless pipe mill is scheduled for installation at the Lorain, Ohio, plant of this U. S. Steel subsidiary.

Long identified with hot-rolled strip and sheet mills, the continuous rolling process will be employed for the first time at Lorain to turn out long lengths of steel pipe without welds as fast as 2000 fpm.

The new process eliminates several steps in the conventional method of making seamless pipe. In standard practice, a solid round steel bar, heated white hot, undergoes five separate operations to be transformed into pipe. The Lorain innovation combines most of these into one step.

The conventional method starts with the first piercing operation in which an opening is formed lengthwise through the solid bar. Then comes the second piercer, in which the opening is enlarged; the high mill, which produces a uniform wall thickness in the pipe; reeling, to attain perfection in the pipe's surfaces; and finally the sizing rolls, where the product attains its desired diameter and length.

In the continuous seamless mill, the innovation comes after the first piercing operation, which remains unchanged. After the first piercing, the shell is processed through a nine-stand continuous rolling mill, which accomplishes the same results as several steps in present practice.

The conventional seamless mill moves its product sidewise down through the several operations. The continuous mill will operate as a straight-line production unit.

The new Lorain mill is designed to make small-size seamless products which are essential to housing and other construction work, ranging from 2-in. boiler tubes to 4½-in. standard pipe.

WAA Lists Machines To Be Sold as Scrap

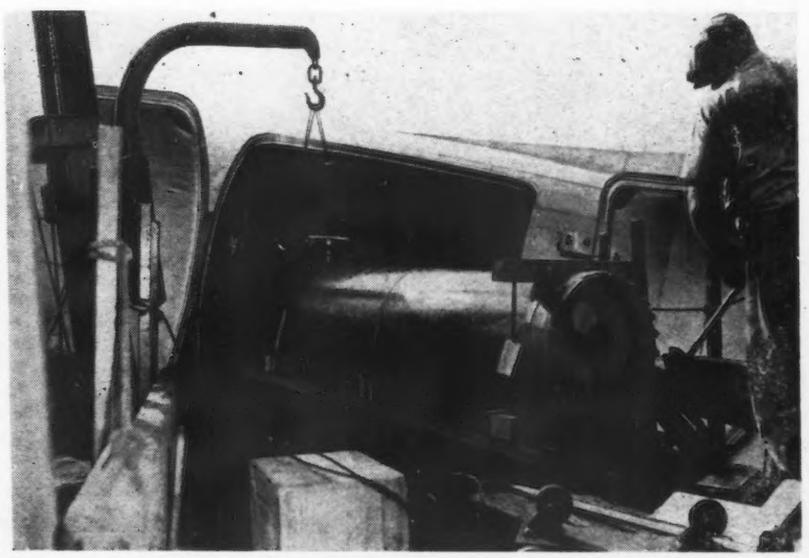
Washington

• • • **WAA has** authorized owning and disposal agencies to sell government-owned surplus unsalable machinery as scrap and salvage where it has been determined that no market exists for such machinery in its present form.

This special machinery, approximating $75 million in acquisition cost, was especially designed for and principally used in the production of small arms munitions. There is little possibility of utilizing them in peacetime economy.

Special machines included in the order are: Baird Machine Co.; 5-spindle continuously turning machine; Baker Machine Co.; Single-end horizontal bomb manufacturing machines; 3½ and No. 24 floor-type, horizontal bomb manufacturing machines; two-way combination machines — bomb manufacturing machines; E. W. Bliss Co.; No. 4, 6, and 7 headers; Black Rock Mfg. Co.: 6" Camelure slotting machines; Cleveland Automatic Machine Co.: Special purpose model B Machine; James Coulter Machine Co.: Model T-1, T-3 and T-5 cartridge machines; Crown Machine & Tool Co.: 3"-6" shell lathes; Ferracute Machine Co.: Horizontal toggle and crank, 50-cal. ammunition press; Henry & Wright Co.: Primer inserting machines; Hepburn-American Co.: Shell lathes, sizes A, B, B-heavy duty, and C; Jones & Lamson Co.: Supercharger bucket grinders; Landis Machine Co.: "Landmaco" shell tappers — models 1½R, 1½RR, and 1½H.O.; Lipe Rollway Corp.: Shell lathes, models B120, B140 and B100; New Britain Machine Co.: Model 49 and 65 chucking machines; Sparks Machine Tool Corp.: Semi-automatic lathes; Sunstrand Machine Tool Co.: Special end mills; sliding head mills; impeller mills; angular sliding head mills; swivel rotary mills; duplex spot fact mills; planetary mills; muff mills.

THREE TONS TAKES TO AIR: *Riggers at Newark Airport load a 3-ton brine cooler aboard a freight carrier of the Flying Tiger Line. Air freight will save 10 days on shipment of this 18-ft long part of a pre-cooling plant for a California citrus fruit packer.*



Lifted From Group E List

Washington

• • • **Paving the way** for normal trade relations so far as economic relations will permit, the Office of International Trade has announced that Austria has been removed from the list of "Group E" countries for which special restrictive export licensing regulations are in effect.

General license privileges which enable exporters to ship freely to most countries goods that are not in short supply are now extended to include Austria. The only countries remaining in the "Group E" category are Hungary, Bulgaria, Romania, Spain, and its possessions, Korea, and the occupied islands of the Pacific. No private trade is as yet permitted with Germany or Japan.

Handicapped Vets Find Jobs Through Machinery Changes

Detroit

• • • **Aid to disabled** veterans and other handicapped individuals is one of the top subjects on the agenda of the Semi-Annual Convention of the American Society of Tool Engineers, which opens Oct. 11 at Pittsburgh.

Executive Secretary Harry E. Conrad disclosed that the engineers will discuss further development of electronically-operated precision gages to permit blind workmen to perform extremely accurate mechanical work.

Ed. note: See THE IRON AGE, *May 23, 1946, p. 57, for Braille Instruments for inspectors.*

"It is quite possible," Mr. Conrad said, "that blindness might even be an asset in the operation of certain types of electronic gages. The blind are usually more sensitive to sound than are persons with normal eyesight."

"In some plants," he added, "tool engineers have been modifying the design of certain production machines—lathes, milling and broaching machines and others—so one armed workers can easily produce on a par with non-handicapped employees."

Mr. Conrad said the engineers attending the Pittsburgh meeting will discuss ways of adapting even more operations so handicapped veterans may earn a normal living. He explained that a disabled person, "Isn't necessarily handicapped—it's just a matter of adjustment, both ways. Industry needs their spirit and know-how."

Mr. Conrad pointed out that many physically handicapped men—with an arm or leg gone—were enabled to take jobs in industry as a result of changes in machines and production setups brought about as a result of the ASTE Exposition Apr. 8-12 in Cleveland.

He said these changes had enabled men who otherwise would have been a burden to society to become highly productive members instead, and predicted many, many others would be benefited by the Pittsburgh meeting.

Babcock & Wilcox Buys 2,000,000-Volt X Ray

Barberton, Ohio

• • • **A 2,000,000-v X ray** machine will be installed by the Babcock & Wilcox Co., here this fall. Purchase of this machine was arranged for during the war. It will be the first use of a machine this size for the purpose of examining welds in pressure vessels. The company also was the first manufacturer of pressure vessels to have a 1,000,000-v unit. The cost of the equipment, together with a special building to be erected, and the installation, will be $150,000.

The new X ray machine will be erected adjacent to the location of the present 1,000,000-v unit. The new building has been designed to protect personnel from radiation and to make possible examination of the largest size drums made by the company.

Although the apparatus, purchased from the General Electric X-Ray Corp., Chicago, is capable of operating at any voltage from 1,000,000 to 2,000,000, it will be used principally at the higher voltages to take pictures of heavy welds, 4 in. thick and over. As compared to the 1,000,000-v X ray, this unit will produce much clearer pictures in that thickness, and will reduce the average time to take radiographs by half. It can be used successfully on steel walls 10 in. thick, while the 1,000,000-v machine can penetrate walls up to 6 or 7 in.

Plants and Pipeline Listed for WAA Sale

Washington

• • • **A government-owned** aluminum plant and the 167-mile Plantation Pipe Line Extension were included in the real property war surpluses recently placed on the market by WAA.

Located at Newark, Ohio, the aluminum plant is designed to produce 10 million lb of blooms and 15 million lb of rods a month. Equipment on the site includes one blooming mill, three bar mills, scalpers and furnaces, together with machine tools and casting and other equipment. Reynolds Metals Co., is believed to be interested in this plant.

Extending from Greensboro, N. C., to Richmond, Va., the pipe line includes easements for a 30-ft right-of-way, four mainline pumping stations, four delivery terminals at Richmond, and other property and equipment. Either property may be obtained by sale or lease.

An East Chicago, Ind., foundry and machine shop, leased and operated during the war by the Continental Foundry & Machine Co., also has been declared surplus and is offered for sale or lease by WAA. The plant was designed to produce 13,500 tons of heavy steel castings annually and has a reported cost of $2,230,582.86 to the government.

NEW LABOR OFFICIALS: *Chief Justice Fred M. Vinson administers the oath of office to Keen Johnson, who was sworn in as Under-Secretary and Ewan Claque as new Commissioner of Labor Statistics. Mr. Claque is at the extreme left; Secretary Schwellenbach is at the right.*

Pig Iron Production In Canada Registered Record Low Since '40

Toronto

• • • **Canadian pig iron** production for the month of June broke to the lowest monthly record since 1940, with 129,890 net tons reported, or 56.2 pct of total rated capacity, and compared with 159,101 tons or 68.9 pct for May and 159,046 tons in June 1945. The total for the month under review included 96,593 tons of basic iron of which 95,253 tons were for further use of producers and 1340 tons for sale; 20,808 tons of foundry iron of which 157 tons were for further use and the balance for sale, and 12,489 tons of malleable iron, all for sale.

During June nine furnaces were in blast and five blown out of the total of 14 furnaces with rated capacity of 2,770,760 net tons a year. Blast furnace charges for the month included 277,847 net tons of iron ore; 17,771 tons of mill cinder, scale, sinter, etc., and 10,022 tons of scrap iron and steel.

For the six months ended June 30, production of pig iron totaled 876,023 net tons compared with 941,963 tons in the first half of 1945 and 949,523 tons in the 1944 period.

Production of ferroalloys in June amounted to 11,624 net tons, against 14,004 tons in May and 18,473 tons in June 1945. Output of ferroalloys in the month under review included by tonnage, ferrosilicon, silicomanganese, ferromanganese, ferrochrome, chrom-x and ferrophosphorus. For the six months ended June, ferroalloy production totaled 68,866 net tons against 98,672 tons in the first half of 1945 and 91,242 tons in 1944.

Following are comparative monthly production figures for 1946, for pig iron and ferroalloys in net tons:

1946	Pig Iron	Ferroalloys
January	143,685	10,878
February	143,171	10,872
March	157,936	8,405
April	142,240	13,083
May	159,101	14,004
June	129,890	11,624
Total 6 months	876,023	68,866

Coming Events

Sept. 10-14 American Chemical Society, exposition, Chicago.

Sept. 11-12 Society of Automotive Engineers, national tractor meeting, Milwaukee.

Sept. 16-20 Instrument Society of America, first conference and exhibit, Pittsburgh.

Oct. 1-4 Assn. of Iron & Steel Engineers, Iron & Steel Exposition, Cleveland Public Auditorium, Cleveland.

Oct. 3-4 Magnesium Assn. of America, New York.

Oct. 3-5 National Electronic Conference, Chicago.

Oct. 3-5 Society of Automotive Engineers, aeronautic meeting and display, Los Angeles.

Oct. 9-11 Porcelain Enamel Institute, University of Illinois.

Oct. 10-12 American Society of Tool Engineers, semi-annual convention, Pittsburgh.

Oct. 16-19 Electrochemical Society, fall congress, Toronto.

Oct. 23-26 National Tool & Die Manufacturers Assn., convention, Chicago.

Oct. 28 American Institute of Steel Construction, annual convention, Coronado, Calif.

Oct. 28-30 American Gear Manufacturers Assn., semi-annual meeting, Chicago.

Oct. 29-Nov. 1. Refrigerator Equipment Manufacturers Assn., exposition, Cleveland.

Nov. 7-8 National Founders Assn., New York.

Nov. 17-22 American Welding Society, annual meeting, Atlantic City, N. J.

Nov. 18-22 National Metal Congress and Exposition, Atlantic City, N. J.

Dec. 2-4 Society of Automotive Engineers, air transport meeting, Chicago.

Dec. 5-7 Electronic Microscope Society of America and American Society for X-ray and Electron Diffraction, joint meeting, Pittsburgh.

Dec. 2-7 National Power Show, New York.

Canadian Steel Ingot Output Lowest in Year

Toronto

• • • **Production** of steel ingots and castings in Canada registered a monthly low for the year in June when output fell to 214,861 net tons or 71.1 pct of capacity against 259,626 net tons or 85.9 pct for May and compares with 257,115 tons in June 1945. Output for the month included 208,296 tons of steel ingots and 6565 tons of steel castings.

Steel furnace charges for June included 97,996 tons of pig iron; 65,425 tons of scrap of consumers own make and 71,591 tons of purchased scrap.

For the six months ended June 30, cumulative output of steel ingots and castings totaled 1,449,639 net tons, which compares with 1,517,966 tons in the 1945 period and 1,512,583 tons in 1944.

Following are comparative monthly production figures in net tons:

1946	Steel Ingots	Castings
January	236,479	8,144
February	226,273	7,620
March	240,589	8,528
April	239,463	8,056
May	251,697	7,929
June	208,296	6,565
Total 6 months	1,402,797	46,842

Gets Wire Price Increases

Pittsburgh

• • • **OPA has granted** Pittsburgh Steel Co. price increases on several wire items. Both bright nails and staples and galvanized staples have been advanced 35¢ per keg. Bale tie wire was raised by $1 per ton and barbed wire advanced 10 columns, or $10 per ton.

The London ECONOMIST

Vacations, 1946

Reprinted by special permission to further understanding on how political and economic affairs are viewed in London.

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IRONIC though it may seem, the nation which sent 11 million men across the world and is still bringing them back regards travel as its favorite form of holiday. The difference is, of course, that this travel is unregimented, and limited only by traffic lights, the carrying capacity of the family car, and the difficulty of finding a place to sleep. Gasoline is again plentiful and cheap, 25 million passenger cars still run (out of a prewar 29 million) and even a few airplanes will take civilians bent on pleasure. The American may still be singing "Don't Fence Me In," but there is a cockier note in his voice as he steps into the old bus and heads for what he hopes will be the open spaces.

That hope is tenuous. Summer hotels are booked months in advance, overnight auto camps are full by mid-afternoon; 60 million citizens on the roads this summer for the simple pleasure of going from here to there is the estimate of the American Automobile Assn.

The impulse to quit work and go fishing which moved in the breast of every healthy American when the Japanese generals gave up their swords a year ago is now climaxing in a $10 billion vacation season. The country is spending the summer, and particularly the month of August, at expensive ease. Not only are city streets deserted from Friday to Monday, but the longer vacation with pay which used to be the prerogative of the white collar workers has now spread into many industries, and in metropolitan areas has even reached domestic servants.

Big shops rotate 2-week holidays among the staff, small ones close for periods that vary with the habits of their clientele. Even Congress in its air-conditioned halls bent all its efforts to get through and take August off. Only nature flouts the new order, and market gardeners complain that in this year of food shortages they are compelled to let thousands of dollars worth of perishable crops spoil because wholesale food handlers in cities will not work more than 5 days a week.

BASICALLY, this August exuberance is habitual and climatic. In a month when the thermometer in Washington, St. Louis and Chicago hovers between 90° and 100° F. the practice of time off was established long before the war. This year other factors have reinforced habit and the weather. In the first place there are all those vacations to be made up which were lost during four war summers when neither soldier nor civilian could take time for play. Families are reunited, and, theoretically at least, enjoying each other's company. In the second place, the improvement in wages and working conditions which came with wartime labor scarcities brought a great increase in the number of people granted annual vacations with pay. Before the war, only 25 pct of the workers carrying union cards enjoyed such privilege, but now 85 pct are so entitled, and because union memberships have sky-rocketed the actual number able to draw pay while playing is even larger than that 60 pct rise would suggest. To them should be added workers living on unemployment compensation between jobs, and returned servicemen spending terminal leave and pay on holiday.

Thirdly and fourthly, most controls are off and money is easier than ever. The difficulty which President Truman had in persuading Congress to restore even a vestige of price control was symptomatic of the national temper. Americans are openly tired of taking thought, they resent being pushed about even by those they appoint to do it, they have money enough to feel that they can disregard the future and revel in an uncorseted state of more or less happy anarchy.

For vacation purposes that anarchy takes definite patterns. Most of the traveling, for instance, is confined to the continental limits of the United States. Unlike the Russians in their larger territory, Americans do not feel cramped at the prospect. A few go to Bermuda and Nassau, more to Mexico and Canada. Boat services have not yet been restored, and plane offices take more reservations than they are able to fill. Tourist travel to Europe, which absorbed $66 out of every $100 of tourist money spent in 1938, is almost impossible, with diplomats and the military having priority even over business men.

What Americans do when they get the family to the road's end depends on the individual, but here too patterns do emerge. The American likes to look at nature, and has never insisted that it be cluttered up with castles. On a single day last April 150 thousand people traveled by sightseeing bus and private car to look at dogwood trees blooming in the park at Valley Forge; on July 4, 2½ million New Yorkers competed for sand, sun, and salt water on only two of the many near-by beaches; 25 millions are expected in the national parks this summer to look at water that falls, steam that rises out of the earth on schedule, bears that beg and rocks that take fantastic shapes.

THE American likes to go fishing, and is having difficulties, for tackle is so hard to get that tinkerers take radio antennae off the family car and convert them into fishing rods. He likes to sail, and here the government helps by providing boat gear from surplus Navy stores at bargain prices. He

(CONTINUED ON PAGE 132)

British Government Plans to Name Permanent Control Board

London

• • • **The insistence of the** British Ministry of Supply that the steel industry here should participate in the drafting of its own death precipitated a deadlock between the British Iron & Steel Federation and the government which required the best offices of a relative outsider to solve. Dr. H. J. Van der Bijl, chairman of the government-controlled South African Iron & Steel Corp., was called to London first to become chairman of the disputed Control Board, but although he declined this magnanimous millstone he has stayed long enough to get Mr. John Wilmot, minister of supply, and Sir Andrew Duncan, chairman of the federation, back on speaking terms and willing to compromise.

The outcome of Dr. Van der Bijl's ministrations alters the terms of reference of the control board, and in consideration of this compromise by the government the federation has agreed to serve on the board.

To take over the control of the industry until nationalization is accomplished the Minister proposed as long ago as April to establish an interim control board. This board was to serve a threefold purpose, replace the warborn Iron and Steel Control in allocating raw materials and setting price ceilings, push forward the federation's own plan for modernizing and rationalizing the British steel industry (see THE IRON AGE, May 23, 1946, p. 114), and to define the limits of the "large measure of public ownership" that the government intended to apply to the steel industry.

It was this last clause that proved the stumbling block for the Ministry of Supply when it asked for federation support on the proposed board. Feeling was running high in the conservative party circles as well as in the industry and federation against nationalization. Leaders of steel firms did not feel that they could honorably discharge their responsibilities to stockholders while seated on a board that was determining how far nationalization should go in the steel industry.

In an exclusive interview with

By JACK R. HIGHT
European Editor

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THE IRON AGE following the completion of his work, Dr. Van der Bijl disclosed that his job had been specifically as a mediator between the two parties, and that there was in fact (despite newspaper reports) no detailed plan or report which he was preparing on nationalization. According to Dr. Van der Bijl, the new board's functions will be the control of prices, distribution and production of the steel industry, and as disclosed by the Minister of Supply it will not function in regard to nationalization.

In regard to the future of the Iron & Steel Federation, Dr. Van der Bijl told THE IRON AGE that this board, despite the fact that its general duties as outlined above roughly correspond to the prewar functions of the federation, will definitely not replace the federation. The approximate pattern will be that the new control board will assume those functions performed during the war by the government's Iron and Steel Control, and that the ministry will make sure that there is no overlapping of functions.

In possibly the most significant departure from any statement given by the Ministry of Supply, Dr. Van der Bijl revealed that this board is definitely of a permanent nature and is not the interim control board which the Minister proposed before the House of Commons this spring.

The original plan as outlined by the Minister before the House of Commons has apparently been quietly scrapped, and it would seem that the government is now willing to appoint a permanent control board and let the steel industry stand under private ownership, but with this increased measure of government control, in the immediate future. If nationalization has not been scrapped, it is at least shelved for the time being.

Under existing circumstances it is difficult to believe that the British steel industry has not received some private assurance from the Labor government beyond what is implied in current official statements. Suggestions now center about a "partnership" between government and industry featuring partial government ownership of individual company stocks, plus government representatives on the board of directors of existing steel firms. This idea has a precedent in the Anglo Iranian Oil Co., and would be acceptable to many industry men.

The Minister probably could have found steel men to aid in the nationalization plan had it not been for the existence of the federation, where the most important steel men meet regularly and are thrown into mutual confidence. This probably operated as a strong psychological factor in the matter. If it had been possible to approach the men on a purely individual basis, and they had felt that they would only be forced to answer to their own companies, one or two men might have been willing to join the board. With a powerful central organization, the Minister took the step of asking the federation for nominations, and to acquiesce would have been an acceptance of the idea of nationalization.

The outcome is that the Ministry of Supply has issued a clarifying statement which indicates that the as yet unnamed board will now concern itself with directing present operations of the steel industry and with pushing forward the $672 million modernization program previously mentioned.

Because of the confusion which has surrounded the exact terms of reference of the control board, and the uncertain financial aspects of the proposed nationalization, this broad modernization plan, prepared by the Iron & Steel Federation at the request of the wartime coalition government, has been virtually stalled. While the government, has at various times tried to give the overall impression that the work is going forward, as a matter of fact only detailed planning is going forward in the case of large scale new construction. Despite an announcement which gave an obscure idea that the work was progressing

satisfactorily, the new hot strip mill site in South Wales has so far seen only surveying work.

Additional information is gradually leaking out in regard to the amounts of various types of machinery which will be purchased for the modernization plan from American producers. As far as the universal beam mill which Dorman Long plans to erect in the North of England, it is doubtful whether any equipment will be imported for this project. Plans are being made to obtain special licenses for the manufacture of this rolling mill equipment in England upon payment of royalties. For the South Wales continuous strip mill and the cold rolling mills for the same district, about $24,000,000 worth of specialized rolling mill equipment will be purchased in America in order to get the equipment in operation within the specified time limit (30 months).

Although the modernization work will be slow, and much industry-government haggling will go on before the parts of the plan are implemented, it seems likely that progress will be surer, if no less slow, when the board is named. Dr. Van der Bijl says it will go forward "immediately." The local press has had an active week in outguessing the oracles on certain aspects of the latest official statement. The favorite London sport this week is trying to determine whether the new statement implies that the socialist government has changed its mind about the idea of nationalizing the industry.

There have been enough newspaper stories to fill a lot of scrapbooks purporting to give the real inside story, but it seems doubtful at the moment if the government has decided itself whether it should ultimately push through the nationalization. One embarrassing aspect of the situation is that the government did in fact demand from Parliament approval of the plan to nationalize the industry, and after a rather desultory 2-day debate in Commons, got the approval. Since that time there have been one or two slight indications that the government might prefer to alter its position in the matter, and back down from outright share acquisition in favor of some increased government control superimposed on the present private ownership, and Dr. Van der Bijl's statement on the permanency of the board gives this theory additional weight.

Some sources state flatly that the government has decided never to nationalize. What the Minister of Supply has accomplished by this latest brief statement is to gather in the help of the federation which he needed, but could have in desperation done without, and ignored the long range implications of the nationalization question. Thus, if he now does not think that government ownership for the steel industry is a good idea, he is passing the buck (he will take a whipping from many rank and file socialist party members if he does such an about face) into the indefinite future. He has now the prospects for a good strong board to run the industry, for 2 yr, or indefinitely, if he chooses. Thus he now has a period of years in which to account for his decisions, rather than having to face them in the immediate future.

The Minister of Supply now promises that he will announce the membership of the board within the next 2 or 3 weeks, and this should be easy to accomplish. He has probably three or four nominations from the federation from which to fill the two seats allotted to this group. One of them seems certain to go to G. H. Latham, who is the head of Whitehead Iron & Steel Co., and is the president-elect of the federation itself. Latham was known in the days of the establishment of the federation as a rugged individualist, and made a powerful fight against certain aspects of federation control in those years. The second seat will probably go either to M. H. Rollason, of John Summers & Sons, or L. E. Mather, of Lancashire Steel Corp., with Mr. Rollason appearing to be the most likely choice.

The trade unions will be represented on the board by Lincoln Evans, president of the Iron & Steel Trades Confederation. Present leaks indicate that two additional members may be selected from among the leaders of the principal steel consuming industries.

The text of the statement by the Ministry of Supply follows:

"As announced in the House of Commons on Apr. 17 last, the government has decided to appoint a board to be responsible to the Minister of Supply for the general control and supervision of the iron and steel industry. . . .

"The government has now decided that the board should concentrate, under the Minister, on the supervision of the development and reconstruction of the industry and on the exercise of such continued direct control functions as may be necessary in such matters as production, distribution and prices. It will not, however, be part of the functions of the board or of the members from the steel industry to advise the government in connection with plans for public ownership. The preparation of such plans, with a view to the submission of proposals to Parliament, will be treated by the government as a separate matter. . . ."

SLUM CLEARANCE: ***The picturesque English village of Harlow will become a modern town of 50,000 under Britain's industrial decentralization plan. Harlow will be one of 20 planned communities designed to drain off a million inhabitants of crowded cities such as London, Manchester and Birmingham.***

Industrial Briefs . . .

• HEVI DUTY EXPANDS—The Hevi Duty Electric Co., Milwaukee, a subsidiary of the North American Co., will purchase the controlling stock of the Surges Electric Co., Milwaukee, if its application is approved by the state securities and exchange commission.

• BUYS WAR PLANT — The Pressed Steel Tank Co., Milwaukee, has purchased the former ordnance plant leased by the government to the Firestone Tire & Rubber Co. for rim manufacturing. The property will be used for increased production of gas cylinders, air compressors and stampings.

• SAFWAY STEEL BUILDS—Safway Steel Products, Inc., Milwaukee, which manufactures portable and permanent scaffolding, has begun construction on an addition. The firm is filling three large orders for bleachers at Shibe Park, Philadelphia, the Boston Braves park in Boston, and the site of the Cleveland air show.

• WAC PURCHASE — Purchase from the War Assets Corp. for $2,300,000 of the facilities that comprise the Fitchburg (Mass.) turbine plant has been announced by the General Electric Co. The company stated it is already spending $500,000 for the expansion of research and production facilities in the plant.

• LAKEY FOUNDRY EXPANDS—An $875,000 expansion and modernization program undertaken by Lakey Foundry & Machine Co., Muskegon, Mich., has been practically completed, according to a company announcement.

• HEIL WILL BUILD—The Heil Co., Milwaukee, has started construction of a $500,000 addition to its plant three there, and also has completed plans for an addition to its plant two at Hillside, N. J.

• AFA APPOINTMENTS—R. J. Allen, metallurgical engineer, Worthington Pump & Machinery Corp., Harrison, N. J., heads the 1946-47 program and papers committee of the gray iron div. of the American Foundrymen's Assn. E. H. Stilwill, chief metallurgist, Chrysler Corp. Dodge Div., has been appointed secretary of the cupola research committee of the AFA.

• BUYS PISTON RING DIV.—Announcement that the additional facilities acquired through purchase of the Defense Plant Corp. property and equipment adjacent to its American Hammered Piston Ring plant in Baltimore will be used for production of automotive piston rings has been made by the Koppers Co., Inc.

• ACQUISITION—The Lake Erie Engineering Corp., Buffalo, designers and manufacturers of hydraulic presses, has taken over the Feller Engineering Co., Pittsburgh, Pa. The activities of the former Pittsburgh company will be carried on by Lake Erie as its Feller Engineering Div. with K. Feller as general manager, with headquarters in the Empire Bldg., Pittsburgh.

• COUNSEL FOR PRICE — Jonathan B. Richards, formerly OPA Assistant General Counsel for Staff Operations, has been appointed Associate General Counsel for Price, succeeding David F. Cavers, who recently resigned to become a member of the Harvard Law School faculty.

• NAMED GENERAL COUNSEL—John G. Alexander, former WAA Assistant General Counsel, has been appointed Acting General Counsel of that government agency, succeeding E. A. Stansfield, resigned. Mr. Stansfield, who was on leave from RFC agreed to serve with WAA when it was created last Mar. 25 upon the understanding that he would remain until he had organized the legal division into a workable unit.

Iron Ore Consumption Tops 6 Million in July

Cleveland

• • • **Consumption of iron** ore during July 1946 was 6,423,035 gross tons, slightly less than for the same month a year ago when 6,532,273 tons were consumed but exceeded the 4,994,936 ton consumption of June 1946 according to the monthly report of the Lake Superior Iron Ore Assn. Cumulative consumption to Aug. 1 amounted to 30,665,323 tons, 16,213,252 tons less than the total to the same date in 1945. U. S. furnaces used 6,385,529 tons of the July 1946 consumption, 6,331,306 of the July 1945 total and 4,835,407 tons of the June 1946 figure.

U. S. furnaces accounted for 29,517,450 of the 1946 cumulative total and 45,395,396 tons of the 1945 consumption to Aug. 1.

On Aug. 1 there were 26,579,935 tons of ore on hand at U. S. furnaces; 551,470 tons at Canadian furnaces; totaling 27,131,305 tons, while U. S. Lake Erie docks had stocks of 3,307,310 tons, making total stocks on hand Aug. 1 of 30,438,615 tons. This compared with 26,264,914 tons at furnaces and Lake Erie docks on July 1, and 29,485,221 on Aug. 1 a year ago.

There were 166 U. S. and 1 Canadian furnaces in blast on Aug. 1, 1946, with 19 U. S. and 9 Canadian idle out of a total of 195 furnaces. This compares with 150 U. S. and 6 Canadian furnaces operating a month ago when 35 U. S. and 4 Canadian furnaces were idle and with 158 U. S. and 7 Canadian on Aug. 1 a year ago when 27 U. S. and 3 Canadian furnaces were idle.

Lifts Price on Cyanides

Washington

• • • **OPA has suspended price** control on several cyanide compounds used in case hardening and electroplating, including sodium, potassium, copper, lead and zinc cyanide, effective Aug. 22. The action covers cyanides of alkalies and metals and mixtures containing more than 25 pct of these chemicals, except silver cyanide.

Suspended at the same time were dispersions of colloidal graphite used in metal forming.

Construction Steel...

New York

• • • **The estimated total** bookings of fabricated structural steel for the month of July 1946, according to reports received by the American Institute of Steel Construction, amounted to 133,039 tons. The estimated total for the first 7 months of the year was 1,100,405 tons, or an increase of 30 pct over the average of 843,752 tons booked for the same period in the 5 prewar years 1936 to 1940.

July shipments totaled 130,980 tons, a slight increase over the previous month. The shipments for the 7 months amounted to 778,845 tons, very closely approximating the average of 800,501 tons shipped for the same months in the 5 prewar years. The tonnage available for future fabrication at July 31 has further increased to 673,839 tons.

Following is the complete tabulation of bookings and shipments:

	Estimated Total Tonnage for the Entire Industry 1946	Estimated Total Tonnage for the Entire Industry Avg. 1936-40
Contracts Closed		
Jan.	235,817	107,578
Feb.	132,707	96,280
Mar.	173,871	124,558
Apr.	128,671*	110,783
May	165,290*	126,237
June	131,010*	125,835
July	133,039	152,481
Total ...	1,100,405	843,752
Shipments		
Jan.	107,490	92,578
Feb.	63,803	88,626
Mar.	102,803	115,031
Apr.	122,511*	123,650
May	124,408*	123,225
June	126,850*	129,969
July	130,980	127,422
Total....	778,845	800,501
Tonnage Available for Fabrication within the Next 4-Months ...	673,839	369,892

*Revised

• • • **Fabricated steel awards** this week included the following:

23,365 Tons, Bettendorf, Iowa, Sheet mill building for Aluminum Co. of America, to Bethlehem Steel Co., Bethlehem, Pa.

12,000 Tons, San Francisco, transformer towers for Pacific Gas & Electric Co., to Bethlehem Steel Co., Bethlehem, Pa.

750 Tons, Cicero, Ill., building for Edison General Electric Appliance Co., to Joseph T. Ryerson & Sons Co., Inc., Chicago.

418 Tons, Saginaw, Mich., manufacturing plant to Whitehead & Kales Co., Detroit.

400 Tons, Chelsea, Mass., state soldiers home to Bethlehem Steel Co., Bethlehem, Pa., through M. S. Kelliher Co., Boston contractor.

400 Tons, Cambridge, Mass., Boston Woven Hose & Rubber Co. plant to A. O. Wilson Structural Steel Co., Cambridge, through F. Le Roy Fox, Inc., contractor.

250 Tons, Bellingham, Wash., Puget Sound Pulp & Timber board mill, to Isaacson Iron Works.

150 Tons, Quincy, Mass., Pneumatic Scale Corp. plant addition to Bethlehem Steel Co., Bethlehem, Pa., through George A. Fuller Co., Boston, engineers.

100 Tons, Buffalo, bays for Lake Erie Engineering Corp., through Siegfried Construction Co., to R. S. McManus Steel Construction Co., Buffalo.

• • • **Fabricated steel inquiries** this week included the following:

8000 Tons, Boston, New England Telephone & Telegraph Co. building, Turner Construction Co., Boston engineers.

1190 Tons, Norfolk, Va., manufacturing plant, U. S. Gypsum Co.

1000 Tons, Scotts Bluff, Neb., municipal hospital.

• • • **Reinforcing bar awards** this week included the following:

500 Tons, Chicago, building for Illinois Bell Telephone Co., through George A. Fuller Co., to Concrete Steel Co.

• • • **Reinforcing bar inquiries** this week included the following:

Recent concrete bar inquiry of 425 tons for sheet mill building at Bettendorf, Iowa, for the Aluminum Co. of America, has been withdrawn to be reinstated later. Bidders estimate the tonnage at 500 to 5000 tons. Actual amount will be determined when bids are reopened.

2750 Tons, Chicago, South side intercepting sewer.

335 Tons, Burlingame, Calif., paving on Bayshore Freeway, California Div. of Highways, Sacramento, bids open Sept. 18.

100 Tons, Douglas County, Nev., paving and structures, Dept. of Highways, Carson City, bids under advisement.

Rust to Design Three Slab Heating Furnaces

Pittsburgh

• • • **A contract to** design and construct three continuous triple-fired slab heating furnaces for the Bethlehem Steel Co. has been awarded the Rust Furnace Co., Pittsburgh. They will cost in excess of $750,000.

The furnaces, which are to be built for the new 66 in. strip mill at Bethlehem's Sparrows Point, Md., plant, are the second to be constructed there by Rust. Earlier, the Pittsburgh firm designed and constructed the furnaces for the large strip mill at Sparrows Point.

The new units will have an effective heating length of 90 ft with an inside width of 24 ft 6 in. Each furnace will have a capacity of 110 tons of steel an hr heated from cold to the rolling temperature of 2250° F.

Canadian Steelmakers Plan Fight to Finish

Toronto

• • • **The Canadian steel** strike appears to have settled down to an all out battle for power as union pickets made plans to fight to the finish. Algoma Steel Corp., and Dominion Steel & Coal Co., are completely closed down, while the Steel Co. of Canada continues production at its Hamilton works. No further shipments of steel have been made from the Hamilton plant since the 3000-ton cargo was moved out a couple of weeks ago for delivery to the company's subsidiary plant at Montreal.

However, Steel Company officials have been endeavoring to make shipments by train and truck and have called upon the local police for protection. Although there has been freer movement of workers into and out of the Stelco grounds, pickets have used force to stop deliveries of materials to the plant and the taking out of the finished steel. It is quite apparent that the Hamilton police force is not strong enough to withstand the attacks of the strikers and the possibility has arisen that the Provincial and even the Mounties may be called in to lend a hand to quell the disturbances.

Moscow Exposition To Show Timken Bearings

New York

• • • **Public presentation** of an exhibit dramatizing the applications of Timken bearings in industry was made last week to representatives of American and Russian industry in the workrooms of Messmore and Damon, Inc., its builders.

The display, planned and constructed over a period of two years, will be part of an international industrial exposition to be held in Moscow this year.

CPA Revises Estimates Of AC Motor Shipments

Washington

• • • **About 1,700,000 fractional** horsepower alternating current motors will be shipped in August, CPA announced on Aug. 23 in revising earlier estimates on the basis of recent reports from the industry.

MACHINE TOOLS

. . . News and Market Activities

Sales Firm; Shortages Cut Deliveries

• • • **While sales** barometers for the machine tool industry are reported to be holding close to expected levels for this season of the year, the industry is faced with a continuing struggle to maintain adequate supplies of necessary components. As in other industries, shortages have greatly retarded machine tool deliveries and many plants have been forced to work on abbreviated schedules because of poorly balanced inventories.

Shipments for the month of July fell off from $28 million to approximately $22 million, but a substantial part of this decline can be accounted for by the long July 4 holiday and a normal seasonal reduction. A further drop in volume is expected during August with vacations and chronic shortages of gray iron castings accounting for the major part of the loss of production.

New orders placed on the books during July were approximately equal to the totals for the month of June.

Backlogs are perhaps the most encouraging factor in the machine tool picture at the present time, aggregating $184,000,000, which is equivalent to nearly 7 months at the present operating rate. Normal backlogs are reported to average about 4 to 5 months.

As a user of nearly one-third of all the gray iron castings produced in the United States, the machine tool industry has naturally felt the full impact of the present crisis in pig iron. With four major sources of pig iron closed, foundries have experienced increasing difficulty turning out castings for the machine tool industry and this situation has been aggravated by the fact that pig iron has been widely used in the production of many castings which would ordinarily be produced using high percentages of scrap.

Available supplies of anti-friction bearings have improved noticeably within recent weeks, but carbon steel in all its forms continues in tight supply. No change has been observed in the rate of delivery of drive and fractional hp motors, which has been for several months the tightest bottleneck in machine tool industry supply lines.

Actual size of WAA surplus continues to be a highly debatable question. Some authorities are of the opinion that as much as 80 to 90 pct of available equipment has already been declared and of this total perhaps one-fifth of the fastest selling items have been sold up to the present time. Meanwhile, the remaining 80 pct remains as a potential barrier to sales of new equipment, with final disposition of this large pool depending, in the final analysis, on the condition and adaptability of the equipment and the price at which it is made available to industry. A substantial change in the Clayton pricing formula, if it is ordered, will naturally necessitate an entirely new appraisal of the weight that surplus is going to carry in the machine tool market.

Machine tool builders who closed their plants, or operated at only fractional rates of production in order to build up balanced inventories, are now reaping the benefits of their foresight. Where such decisions were taken the builder is now in many cases able to draw upon supplies accumulated during periods when operations were halted. Thus, management has been relatively free from the hand-to-mouth struggle that has characterized so many attempts to operate on a continuous basis. Freedom from supply crises, fewer revisions of production schedules, and, in many instances, reduced production costs are some of the benefits that have followed the adoption of such an operating policy during the early months of this year.

In Boston and the East, WAA is out again this week with a deluge of 6-column newspaper advertising offering $20,000,000 of gear shapers, screw machines, lathes, drilling machines, grinders, milling machines, threading machines, press rolling machines and an extensive list of miscellaneous surplus equipment at Natick, New Bedford and East and West Springfield plants. As might be expected, the advertising has acted as a wet blanket on new and used tool buying and demand for such equipment has reached a new 1946 low level.

Reports for the first half of this year by machine tool manufacturers in most cases show deep inroads made during the period, due to labor troubles and surplus tool sales. To make these reports less discouraging to stockholders, companies have utilized tax carryback credits to the fullest extent.

Reed-Prentice Corp., Worcester, is one of the few manufacturers in New England to show consistent earnings. Having split up its stock three-for-one this year, the company is paying regular quarterly and extra dividends and at the same time putting earnings back into surplus.

In Detroit the brisk demand for highly specialized machine tools is being maintained, although builders have been hampered in making deliveries because of a shortage of castings and electric motors. A substantial number of foreign orders both for new and used machines are coming in and builders and dealers find this volume particularly helpful in maintaining operations at satisfactory levels. Machines held in surplus are reported to be well picked-over and there is a feeling that unless prices are drastically cut, the threat to the market from this source is likely to be less formidable than was anticipated a few months ago.

To Aid Small Business

Washington

• • • **The appointment of** John M. Frier, former WPB and SWPC regional director, as chief of its newly created Small Business Branch, has been announced by WAA.

The purpose of the newly formed group is to assist small business men seeking to purchase surplus property. Work of the branch at the policy level has already begun.

Sunbeam STEWART

THE BEST INDUSTRIAL FURNACES MADE

For ANNEALING STAINLESS STEEL POTS AND PANS

at HERCULES FOOD SERVICE EQUIPMENT, Inc., Brooklyn, N. Y.

SPECIAL EXTENSION DOOR OPERATING HOIST
No. 67 OF A SERIES of Typical Installations
SUNBEAM STEWART SINGLE VALVE CONTROL
WORK HANDLING AND LOADING TRUCKS

Stainless steel baking pan discs being annealed in the Sunbeam Stewart gas-fired semi-muffle furnace. This operation softens and anneals the sheets so they can be easily deep drawn without damage. Note the flues on either side of the vestibule wall of the door which pull heat toward the front of the furnace. This feature is especially desirable in such cases where a large door opening is required with resulting cooling off. Just another example of Sunbeam Stewart "Know-how" in design and construction to overcome a natural condition.

For the important heat treating of stainless steel blanks and stampings between drawing operations, Hercules use a Sunbeam Stewart gas-fired semi-muffle furnace with the following inside dimensions: Height 24", width 48", length 96".

The multiplicity of burners, spaced along each side of the furnace and firing underneath the semi-muffle hearth, give uniform temperature throughout the work area. Easy maintenance is a popular feature of this installation since the lining and insulation is standard first quality refractory and insulating brick. It has been in operation for two years with no maintenance costs to date.

This installation is typical of the industrial furnaces Sunbeam Stewart engineers are building every day to meet the specified requirements of manufacturers all over the continent. Sunbeam Stewart builds, in addition, a full line of standard furnaces.

FREE ON REQUEST

HEAT TREATING WALL CHART

Large 21" x 23" wall chart of steel specifications and heat treatments. Currently revised to contain late NE, SAE and AISI steels and heat treatment. Write Sunbeam Stewart, Dept. 110, for yours today.

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NONFERROUS METALS

. . . News and Market Activities

OPA Raises Brass And Bronze Ingot Prices

Washington

• • • **Effective Aug. 27,** price increases have been granted by OPA to brass and bronze ingot producers to cover losses in melting scrap. This was not provided for in the June 3 ingot price increase.

An increase of 25¢ per lb is permitted producers of red and yellow brass and the two bronze (88-10-2 and 80-10-10) groups. These four groups make up about 92 pct of current ingot production, the price agency said.

Also, producers of trade name ingots previously qualifying for higher prices may increase their ceilings by 2.375¢ per lb of copper contained and 1.75¢ a lb of lead contained in their alloys.

Meanwhile, two other copper actions were announced effective Aug. 23. In one, premiums for copper resellers have been raised ¼¢ per lb in each quantity sales bracket in order to restore the average percentage mark-ups in effect March 31. Only a dollar-and-cent pass-on had been permitted with the base price increase of June 3.

In the second action, manufacturers of copper electrical coils and windings were authorized an increase of 1.1¢ for each 1¢ increase in the price of copper; the additional 0.1¢ covers wastage in manufacture. Resellers are permitted rises by the same percentage as their net invoiced costs are increased.

•

Silver

Washington

• • • **Manufacturers using** silver in making wire and cable may raise their ceiling prices for such products by the same amounts as their silver costs have been increased, according to OPA. Effective Aug. 23, the action was necessary because the industry could not absorb any part of the increase brought about by the Treasury increase from 71.11 cents to 90.5 for domestic silver as authorized by Congress.

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Lead

New York

• • • **Lead consumers** are reported to have requested a total of 79,000 tons of lead for September delivery at last week's meeting of the Lead Producers' Industry Advisory Committee of CPA. Allocations are understood to have been slightly more than 21,000 tons. All allocations must be cancelled if shipment is not made by the 15th of the following month under Office of Metals Reserve regulations and this is a matter of real concern to the industry who have asked CPA to take it up with OMR for consideration.

At the end of July the Office of Metals Reserve had 33,751 short tons of lead in the stockpile, a drop of 7600 tons in the month from 41,362 tons at the end of June. These figures cover only OMR metal held in the United States. It has been estimated that the total stockpile of OMR including foreign stocks would equal 38,000 tons, the figure below which it was said a short time ago the stockpile would not be permitted to go. About 7500 tons of foreign lead are due to arrive in September, and 7500 tons additional from foreign ores smelted in this country for OMR. It is also expected that the 25 pct of production to be set aside in September for CPA allocation may reach 5000 tons.

OPA has announced that it is permissible to export lead refined in this country from foreign ores and concentrates at the world lead price. It had formerly been necessary to observe domestic ceilings for this metal.

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Washington

• • • **Resellers of lead** products may raise their maximum prices enough to restore their March 31, 1946, percentage mark-ups on these products as required by the Price Control Extension Act of 1946, OPA announced on Aug. 23.

•

Zinc

Washington

• • • **Withdrawals** of high-grade (99.9 pct) zinc from the government stockpile will again be permitted on a limited basis upon approval of the CPA in an attempt to prevent further shut-down of a number of steel and brass mills, zinc rolling mills, ingot makers and other zinc consuming plants.

Widespread dissatisfaction because of the OPA price ceilings, which are below foreign markets, has brought about withdrawal from the market of a number of producers; this has resulted in a continuing decline in production with the monthly output estimated as of Aug. 22, now at about 40,600 tons—31,400 tons short of requirements and 12,000 tons less than July production.

Withdrawals from the stockpile were permitted in July when production failed to meet needs by more than 19,300 tons. These were discontinued in August because of the shrinking stockpile but have been resumed on a limited basis for cases of urgent necessity.

Only high-grade will be released, however since the small tonnage of the other five grades (total 60,810) is frozen against national emergency. About 141,800 tons of high grade remains in the stockpile, plus a monthly increment of 5000 tons from the metals reserve.

Nonferrous Metals Prices

Cents per pound

	Aug. 21	Aug. 22	Aug. 23	Aug. 24	Aug. 26	Aug. 27
Copper, electro., Conn.	14.375	14.375	14.375	14.375	14.375	14.375
Copper, Lake, Conn.	14.375	14.375	14.375	14.375	14.375	14.375
Tin, Straits, New York	52.00	52.00	52.00	....	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25	8.25	8.25
Lead, St. Louis	8.10	8.10	8.10	8.10	8.10	8.10

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb)	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be	$14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be	$30.00
Cadmium, del'd	$1.25
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Copper, electro, Conn. Valley	14.375
Copper, electro, New York	14.125
Copper, lake, Conn. Valley	14.375
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$ 2.25
Iridium, dollars per troy oz.	$125.00
Lead, St. Louis	8.10
Lead, New York	8.25
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$99 to $100
Nickel, electro, f.o.b. refinery	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$33.00
Silver, New York, cents per oz.	90.125
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.69
Zirconium copper, 6 pct Zr, per lb contained Zr	$ 6.00

Remelted Metals

(Cents per lb)

Aluminum, No. 12 Fdy. (No. 2)	12.50 to 12.75
Aluminum, deoxidizing	
No. 2	13.00
No. 3	12.00
No. 4	11.50
Brass Ingot—ceiling prices	
85-5-5-5 (No. 115)	15.50
88-10-2 (No. 215)	18.75
80-10-10 (No. 305)	18.25
No. 1 Yellow (No. 405)	12.50

Copper, Copper Base Alloys

(Mill base, cents per lb)

	Extruded shapes	Rods	Sheets
Copper	25.66	....	25.81
Copper, H.R.	....	22.16	....
Copper drawn	....	23.16	....
Low brass, 80%	....	24.35	24.66
High brass	....	....	23.67
Red brass, 85%	....	24.67	24.98
Naval brass	23.84	22.59	28.53
Brass, free cut	....	18.53	....
Commercial, bronze	....	25.50	25.81
Manganese bronze	27.45	25.95	32.03
Phosphor bronze, A, B, 5%	....	43.70	43.45
Muntz metal	23.59	22.34	26.78
Everdur, Herculoy, Olympic or equal	....	29.82	30.88
Nickel silver, 5%	....	34.44	32.38
Architectural bronze	22.50	....	....

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢, 52S-O, 67¢ 24S-T, 71¢: base, 30,000 lb.

Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb and over.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb and over.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 27.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢ 1 in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18: 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base; B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢; B & S 15-16: 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

(Continued, See Next Column)

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb or more, 46¢ a lb; 25 to 90 lb, 56¢; less than 25 lb, 66¢.

NONFERROUS SCRAP METAL QUOTATIONS

†*(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)*

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	11.50
No. 1 tinned copper wire, No. 1 tinned heavy copper	11.50
No. 2 wire, mixed heavy copper	10.50
Copper tuyeres	10.50
Light copper	9.50
Copper borings, No. 1	11.50
No. 2 copper borings	10.50
Lead covered copper wire, cable	....*
Lead covered telephone, power cable	....*
Insulated copper	....*

OPA Group 2†

Bell metal	17.25
High grade bronze gears	15.00
High grade bronze solids	....*
Low lead bronze borings	....*
Babbitt lined brass bushings	14.75
High lead bronze solids	....*
High lead bronze borings	....*
Red trolley wheels	12.50
Tinny (phosphor bronze) borings	12.25
Tinny (phosphor bronze) solids	12.25
Copper-nickel solids and borings	11.00
Bronze paper mill wire cloth	11.25
Aluminum bronze solids	10.75
Soft red brass (No. 1 composition)	10.75
Soft red brass borings (No. 1)	10.75*
Gilding metal turnings	10.25
Contaminated gilded metal solids	10.25
Unlined standard red car boxes	10.00
Lined standard red car boxes	9.50
Cocks and faucets	9.50
Mixed brass screens	9.50
Red brass breakage	9.25
Old nickel silver solids	7.60
Old nickel silver borings	7.50
Copper lead solids, borings	6.75
Yellow brass castings	7.50
Automobile radiators	8.75
Zincy bronze solids, borings	9.75

OPA Group 3†

Fired rifle shells	9.50
Brass pipe	8.75
Old rolled brass	8.25
Admiralty condenser tubes	8.75
Muntz metal condenser tubes	8.25
Plated brass sheet, pipe reflectors	7.75
Manganese bronze solids	8.00[1]
Manganese bronze solids	7.00[2]
Manganese bronze borings	7.25

OPA Group 4†

Refinery brass	6.00*

*Price varies with analysis. [1] Lead content 0.00 to 0.40 pct. [2] Lead content 0.41 to 1.00 pct.

Brass Mill Scrap†

Briquetted cartridge brass turnings	10.375
Cartridge brass turnings, loose	9.625
Loose yellow brass trimmings	9.625

Aluminum

Plant scrap, segregated

2S solids	8.50 to 9.00
Dural alloys, solids 14, 17, 18, 24S, 25S	6.00 to 6.25
turnings, dry basis	1.50 to 1.75
Low copper, alloys 51, 52, 61, 63S solids	8.00 to 8.50
turnings, dry basis	5.00 to 6.50

Plant scrap, mixed

Solids	4.25 to 4.50
Turnings, dry basis	1.50 to 1.75

Obsolete scrap

Pure cable	6.50 to 7.50
Old sheet and utensils	5.00 to 5.50
Old castings and forgings	5.00 to 5.50
Pistons, free of struts	4.00 to 4.50
Pistons, with struts	2.50 to 3.00
Old alloy sheet	2.00 to 2.50

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	1.50

Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings	7.50
Engravers, lithographers plates	7.50
Old zinc scrap	5.75
Unsweated zinc dross	6.00
Die cast slab	5.50
New die cast scrap	5.45
Radiator grilles, old and new	4.50
Old die cast scrap	4.00

Lead

Deduct 1.40¢ a lb from refined metal basing point prices for refinery charge on used battery plates.

Soft lead scrap	7.50

Nickel

Ni content 98+%, Cu under ½%, 23¢ per lb; 90 to 98% Ni, 23¢ per lb contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	29.75
Electrodeposited	23.47
Rolled, oval, straight, delivered	23.72
Curved, 18 in. or longer, delivered	23.72
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	27.25
Zinc, cast, 99.99, 15 in. or longer	17½
Nickel, 99 pct plus, frt allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 100 oz. lots, per oz.	95⅞

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 1-5 bbls	34.00
Copper sulphate, 99.5, crystals, bbls	7.75
Nickel salts, single, 425 lb bbls, frt allowed	13.50
Silver cyanide, 100 oz lots, per oz.	0.749
Sodium cyanide, 96 pct, domestic, 125 lb drums	15.00
Zinc cyanide, 100 lb drums	33.00
Zinc sulphate, 89 pct, crystals, bbls, frt allowed	6.35

SCRAP

. . . News and Market Activities

Industry Awaits Outcome of Price Plea

New York

• • • **Shipments** continued poor this week as the scrap trade awaited the outcome of its plea for price relief. The Institute of Scrap Iron & Steel prepared three recommendations for OPA consideration at the meeting scheduled for Aug. 28 in Washington. The industry is asking a general price increase of $3.50 a ton, an increase of $1.50 in preparation charges and a ceiling on unprepared as well as prepared scrap. The principal reason for asking that a ceiling be set on unprepared scrap is the increasing tendency of interests outside the scrap field to buy scrap at prices well above what it can be prepared for and sold at the ceiling. Although it may be moving at OPA top prices it is sold on the understanding that the sellers will receive finished products from the mill or foundry buying the scrap.

Foundry grades are in critically short supply and there are occasional reports of this material moving at over ceiling prices in truckload lots. The poor scrap quality and high pig charges are seriously cutting into operations with rejects mounting constantly.

Some criticism of the delay in the shipbreaking program is beginning to be heard. Observers who originally hoped it might make itself felt about the first of the year now believe shipbreaking scrap will not move in volume until Spring.

•

PITTSBURGH—There has been no change in the scrap situation here this week and the respective opinions of scrap men and steel companies is unchanged. There is hope on the part of the steel mills that the stepup in the amount of iron made will help to stave off more serious shortages of scrap. On the other hand there are still those who insist that the flow of scrap is slightly better even though the tonnages are not up to expectations.

•

CHICAGO—Scrap movements continue to improve with shipments meeting current demand but not increasing inventory stocks. More customers are approaching the mills to barter scrap for products but in most cases are turned down cold. Fabricators lists are showing improvement as are the stocks in dealers yards, with the latter still being held for higher prices, which some believe are inevitable. Operating rates for the moment remain unimpaired by scrap shortages but all steel producers are apprehensive of the Winter months as stocks have decreased instead of being built up as is the usual summertime practice.

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PHILADELPHIA—Foundry scrap is almost nonexistent here, while brokers shipments are reported to be off about 30 pct compared to June figures. Nevertheless, a slight upward trend in shipments is discernable. A check of a score of yards last week, according to one trade source here, indicates little foundation for "hoarding charges." This observer reports that while unprepared scrap is present in some quantity in the yards, there is very little prepared scrap in dealer stocks.

•

DETROIT—With scrap production and collection in Detroit off as much as 65 pct as compared with 1941 and most available scrap being shipped to outside steel centers, Detroit steelmakers have been placed in an extremely tight spot for lack of scrap. Under present conditions, Detroit's position has been changed from that of a scrap surplus area to a scrap deficiency area and the deficit appears to be growing every day in the face of continued agreements between steelmakers and steel users and pressure by steel warehouses to trade scrap for finished steel. The amount of cross-hauling resulting from these steel-for-scrap arrangements is enormous and the entire Detroit market is naturally badly dislocated from an economic and geographical standpoint.

•

BOSTON—Some foundry steel is moving in truckiots. Stove plate is selling out of Providence at $21.22 a ton plus carting charges. Otherwise the situation is tight, almost everybody waiting for OPA to take a price stand. Its ruling that no higher than ceiling can be paid for prepared scrap on a yard to yard basis has shut off a heretofore profitable trade. Scrap continues to accumulate in yards, but it is very largely suitable only for bundling.

•

NEW YORK—Brokers here are struggling to keep shipments flowing in the face of the report that the Scrap Institute's committee is slated to meet with the OPA this week to ask for more money. There are well founded reports that fairly substantial quantities of material are being held for higher prices, though a certain amount of overgrading is common. Though this gives the dealer an extra $2.50 most eastern mills will not accept overgraded shipments despite their serious plight.

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BUFFALO — With scrap receipts of local mills running about 25 pct of normal or less, trade leaders contend a "pump priming" operation of major proportions is indicated, but see no prospects of early relief from the government's ship breaking program. The appeal of one leading steel producer to its customers for quick shipments of all available scrap has had only so-so results—an additional carload here and there. At the start of the week dealers were waiting, none too patiently, for word from OPA conference on scrap prices. An eventual increase of one dollar in preparation allowances, or possibly the $1.50 a ton requested, was regarded as the best bet with little hope held for a $3.50 across the board boost.

•

CLEVELAND—The scrap supply situation in this area gives no indication of improvement. One large mill in the Youngstown district is said to have completely exhausted its scrap supply and is currently operating directly from freight cars. Most dealers are moving scrap that is available with only a few holding back for possible favorable price action. Scrap movements from Michigan have been disappointing this season, partly because one large source has found it necessary to trade a large amount of scrap for pig iron.

•

ST. LOUIS—It's the same old story in the scrap iron market here. People who own the material are holding it in the hope of getting higher prices from the OPA and nothing is coming in except from the railroads. The railroads are still designating the mills to whom their scrap must be shipped and a lot of it is being sent to other centers. The steel mills in the industrial district are well supplied but some of the foundries need cast iron and specialties.

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BIRMINGHAM—The market here is very slow and any return to normal activity appears unlikely until OPA announces its policy toward future scrap prices. Some tonnages reportedly are being shipped to mills on an exchange basis for finished steel products.

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CINCINNATI—Dealers and brokers indicate that there is probably some scrap being held in hopes of higher prices, but the extent of this is not known. Flow of scrap into the market is lower than heretofore, although the demand continues to be very strong. Reserves of some local foundries and one mill are virtually gone, and operations are being sustained on current shipments.

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TORONTO—With the three major basic steel mills closed down due to strikes, a lull has developed in shipments of steelmaking scrap, while at the same time there has been a speeding up in demand for iron scrap materials by melters unable to obtain pig iron for current needs. Scrap iron and steel receipts have dropped sharply in the past week or two as industrial operations are curtailed or suspended through shortage of steel and other raw materials. While dealers are stockpiling steel scrap they state that there has been no falling off in demand and that yards will be cleaned out of present stocks as soon as deliveries can be resumed to the steel plants.

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Where asterisks are used they indicate the OPA ceiling price to which must be added brokerage fee and adjusted freight.

PITTSBURGH

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bdld. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	15.00*
Short shov. turn.	17.00*
Mixed bor. and turn.	15.00*
Cast iron borings	16.00*
Hvy. break cast.	16.50*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Rolled steel wheels	24.50*
Low phos. bil. crops	25.00*
Low phos.	22.50*
RR. malleable	22.00*

CHICAGO

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	18.75*
Galv. bundles	16.75*
Mach. shop turn.	13.75*
Short shovels, turn.	15.75*
Cast iron borings	14.75*
Mix. borings & turn.	13.75*
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Angles & splice bars	22.25*
Locomotive tires, cut	24.25*
Cut bolsters & side frames	22.25*
Standard stl. car axles	25.75*
No. 3 steel wheels	23.25*
Couplers & knuckles	23.25*
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast	20.00*
Rails 3 ft. and under	22.25*
No. 1 agricul. cast	20.00*
Hvy. breakable cast.	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast	20.00*
Cast iron carwheels	20.00*

CINCINNATI

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
No. 1 bundles	19.50*
No. 2 bundles	19.50*
Mach. shop turn.	$10.50 to 11.00
Shoveling turn.	12.50 to 13.00
Cast iron borings	11.50 to 12.00
Mixed bor. & turn.	11.50 to 12.00
Low phos. plate	22.00*
No. 1 cupola cast.	20.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Scrap rails	21.00*

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$15.05*
No. 2 hvy. melting	15.05*
Nos. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shovelings	12.05*
Machine shop turn.	10.05*
Mixed bor. & turn.	10.05*
Cl'n cast. chem. bor.	$13.06 to 14.15*
Machinery cast	20.00*
Breakable cast.	16.50*
Stove plate	19.00*

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	12.32*
Short shov. turn.	14.32*
Cast iron borings	13.32*
Mixed bor. & turn.	12.32*
Low phos. plate	19.82*
No. 1 cupola cast.	20.00*
Charging box cast.	19.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Automotive cast.	20.00*

PHILADELPHIA

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	13.75*
Shoveling turn.	15.75*
Cast iron borings	14.75*
Mixed bor. & turn.	13.75*
No. 1 cupola cast.	20.00*
Hvy. breakable cast.	16.50*
Cast, charging box	19.00*
Hvy. axle forge turn.	13.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

ST. LOUIS

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

Heavy melting	$17.50*
Bundled sheets	17.50*
Mach. shop turn.	12.50*
Locomotive tires, uncut	21.00*
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft and under	21.50*
RR. springs	22.00*
Steel car axles	24.50*
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	20.00*
No. 1 mach'ery cast	20.00*
Breakable cast.	16.50*

BIRMINGHAM

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Long turnings	12.00*
Shoveling turnings	14.00*
Cast iron borings	13.00*
Bar crops and plate	$18.50 to 19.50*
Structural and plate	18.50 to 19.50*
No. 1 cast	20.00*
Stove plate	19.00*
Steel axles	18.50*
Scrap rails	18.50
Rerolling rails	20.50*
Angles & splice bars	20.50 to 21.00
Rails 3 ft. & under	21.00*
Cast iron carwheels	19.00*

YOUNGSTOWN

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop turn.	15.00*
Short shovel. turn.	17.00*
Cast iron borings	16.00*

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$15.33*
No. 2 hvy. melting	15.33*
Comp. black bundles	15.33*
Comp. galv. bundles	13.33*
Mach. shop turn.	10.33*
Mixed bor. & turn.	10.33*
Shoveling turn.	12.33*
No. 1 cupola cast.	20.00*
Hvy. breakable cast	16.50*
Charging box cast	19.00*
Stove plate	19.00*
Clean auto cast	20.00*
Unstrip. motor blks.	17.50*
Cl'n chem. cast bor.	14.33*

BUFFALO

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	14.25*
Shoveling turn.	16.25*
Cast iron borings	15.25*
Mixed bor. & turn.	14.25*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

CLEVELAND

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00
No. 2 bundles	19.50*
Mach. shop turn.	14.50*
Short shovel.	16.50*
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Low phos. billet and bloom crops	24.50*
Cast iron borings	15.50*
Mixed bor. & turn.	14.50*
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch	22.00*

SAN FRANCISCO

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

RR. hvy. melting	$18.00*
No. 1 hvy. melting	17.00*
No. 2 hvy. melting	17.00*
No. 2 bales	$15.00 to 15.75
No. 3 bales	8.50 to 9.25
Mach. shop turn.	6.50 to 7.25
Elec. furn. 1 ft. und.	15.50 to 17.00
No. 1 cupola cast.	19.00 to 21.00

LOS ANGELES

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	$17.00
No. 2 hvy. melting	17.00
No. 1 bales	$16.00 to 17.00
No. 2 bales	15.50 to 16.00
No. 3 bales	8.00 to 9.00
Mach. shop turn.	7.00
No. 1 cupola cast.	19.00 to 21.00

SEATTLE

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

RR. hvy. melting	$14.50*
No. 1 & No. 2 hvy. melting	14.50*
Elec. furn. 1 ft. und.	$14.00 to 15.00
No. 1 cupola cast.	20.00*

HAMILTON, ONT.

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

Comparison of Prices . .

Advances over past week in **Heavy Type**; declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	Aug. 27, 1946	Aug. 20, 1946	July 23, 1946	Aug. 28, 1945
Hot-rolled sheets	2.425	2.425	2.425	2.20
Cold-rolled sheets	3.275	3.275	3.275	3.05
Galvanized sheets (24 ga.)	4.05	4.05	4.05	3.70
Hot-rolled strip				
6-in. and under	2.45	2.45	2.45	2.10
Over 6 in.	2.35	2.35	2.35	2.10
Cold-rolled strip	3.05	3.05	3.05	2.80
Plates	2.50	2.50	2.50	2.25
Plates, wrought iron	4.112	4.112	4.112	3.80
Stain's c-r strip (No. 302)	30.30	30.30	30.30	28.00
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes.	$5.00	$5.00	$5.00	$5.00
Tinplate, electro (0.50 lb)	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.50	2.50	2.50	2.25
Cold-finished bars	3.10	3.10	3.10	2.75
Alloy bars	2.92	2.92	2.92	2.70
Structural shapes	2.35	2.35	2.35	2.10
Stainless bars (No. 302).	25.97	25.97	25.97	24.00
Wrought iron bars	4.76	4.76	4.76	4.40
Wire and Wire Products: (cents per pound)				
Bright wire	3.05	3.05	3.05	2.75
Wire nails	3.75	3.75	3.75	2.90
Rails: (dollars per net ton)				
Heavy rails	$43.39	$43.39	$43.39	$43.00*
Light rails	49.18	49.18	49.18	45.00*
*per gross ton				
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$39.00	$39.00	$39.00	$36.00
Sheet bars	38.00	38.00	38.00	36.00
Slabs, rerolling	39.00	39.00	39.00	36.00
Forging billets	47.00	47.00	47.00	42.00
Alloy blooms, billets, slabs	58.43	58.43	58.43	54.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.30	2.30	2.30	2.15
Skelp	2.05	2.05	2.05	1.90

Pig Iron*: (per gross ton)	Aug. 27, 1946	Aug. 20, 1946	July 23, 1946	Aug. 28, 1945
No. 2 foundry, Phila.	$30.43	$30.43	$28.34	$26.84
No. 2, Valley furnace	28.50	28.50	26.50	25.00
No. 2, Southern, Cin'ti	27.80	27.80	28.94	25.44
No. 2, Birmingham	24.88	24.88	24.88	21.38
No. 2 foundry, Chicago†	28.50	28.50	26.50	25.00
Basic, del'd eastern Pa.	29.93	29.93	27.84	26.34
Basic, Valley furnace	28.00	28.00	26.00	24.50
Malleable, Chicago†	28.50	28.50	26.50	25.00
Malleable, Valley	28.50	28.50	26.50	25.00
L. S. charcoal, Chicago	42.34	42.34	42.34	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.
‡ For carlots at seaboard.
* Prices retroactive to May 29; the price increase should be reflected in THE IRON AGE Comparison of Prices table since June 4.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.32
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$8.75	$7.50	$8.75	$7.50
Foundry coke, prompt	8.50	8.50	9.85	9.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	14.375	14.375	14.375	12.00
Copper, Lake, Conn.	14.375	14.375	14.375	12.00
Tin, Straits, New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	9.50	8.25
Lead, St. Louis	8.10	8.10	9.50	6.35
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Aug. 27, 1946	2.73011¢ per lb.	$28.13 per gross ton	$19.17 per gross ton
One week ago	2.73011¢ per lb.	$28.13 per gross ton	$19.17 per gross ton
One month ago	2.73011¢ per lb.	$28.13 per gross ton	$19.17 per gross ton
One year ago	2.44076¢ per lb.	$24.61 per gross ton	$19.17 per gross ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1946	2.73011¢ July 4	2.54490¢ Jan. 1	$28.13 May 29	$25.37 Jan. 1	$19.17	$19.17
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	$19.17 Jan. 2	$18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 3

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

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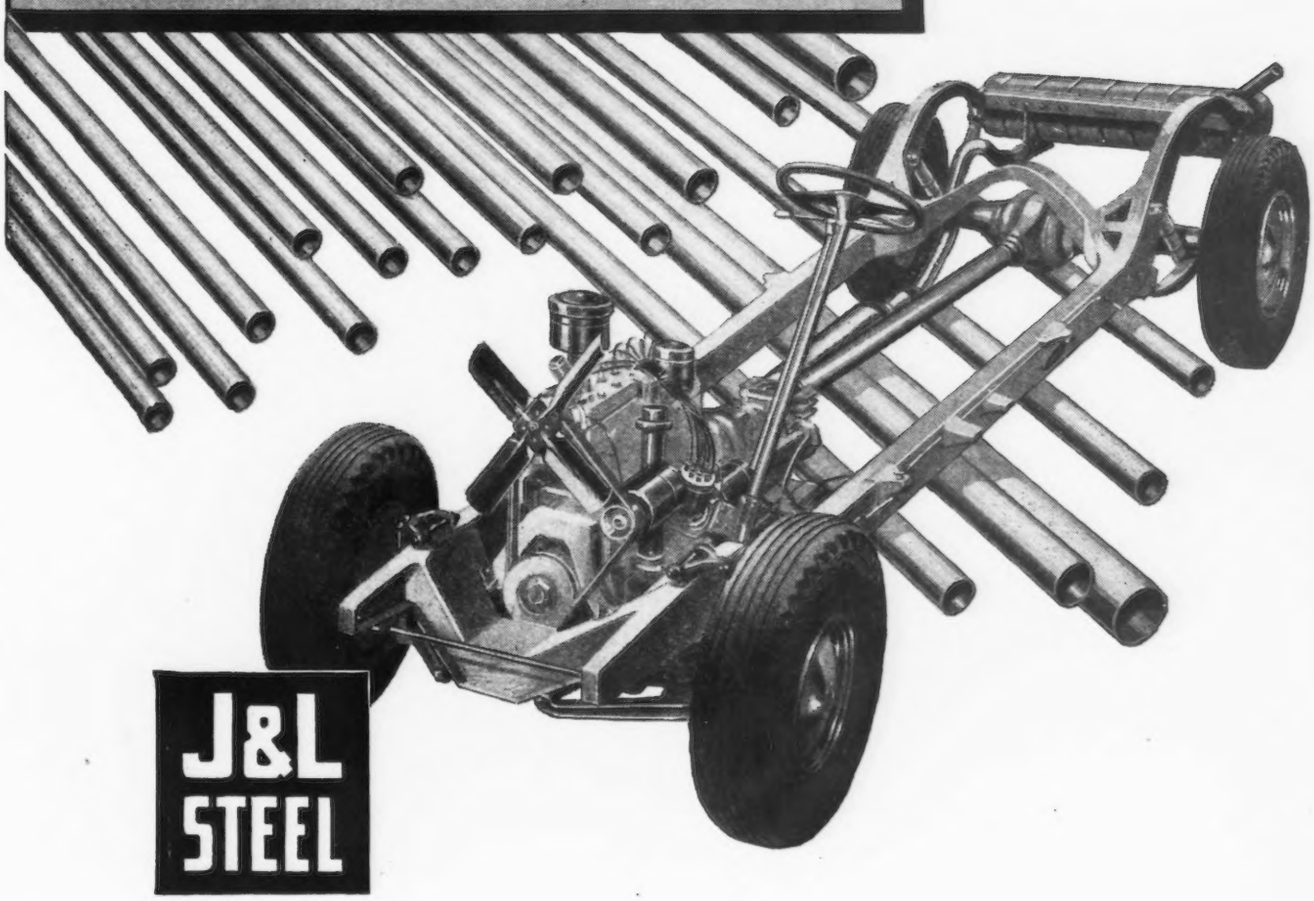

J&L STEEL

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PITTSBURGH 30, PENNSYLVANIA

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points, in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. (14) Billets only. (15) 9/32 in. to 47/64 in., 0.15¢ per lb higher.

Basing Points	Pitts-burgh	Chicago	Gary	Cleve-land	Birm-ingham	Buffalo	Youngs-town	Spar-rows Point	Granite City	Middle-town, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	DELIVERED TO Detroit	New York	Phila-delphia
INGOTS Carbon, rerolling	($33.00 f. o. b. mill)														
Carbon, forging	$38	$38	$38	$38	$38	$38	$38								
Alloy	$49.69	$43.69				$43.69	(Bethlehem, Massillon, Canton, Coatesville=$48.69)								
BILLETS, BLOOMS, SLABS Carbon, rerolling	(Provo=$50.20, Duluth=$41[14]) $39	$39	$39	$39	$39	$39	$39	$39				$51[14]	$41		
Carbon, forging billets	(Provo=$58.20, Duluth=$49[14]) $47	$47	$47	$47	$47	$47	$47					$59[14]	$49		
Alloy	$58.43	$58.43				$58.43	(Bethlehem, Massillon, Canton=$58.43)						$60.43		
SHEET BARS	$38	$38		$38		$38	$38	$38	(Canton=$38)						
PIPE SKELP	2.05¢	2.05¢					2.05¢	2.05¢	(Coatesville=2.05¢)						
WIRE RODS [15] No. 5 to 9/32 in.	2.30¢	2.30¢		2.30¢	2.30¢		(Worcester=2.40¢)				2.55¢	2.80¢			
SHEETS Hot-rolled	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.525¢	2.425¢		2.975¢	2.525¢	2.685¢	2.615¢
Cold-rolled [1]	3.275¢	3.275¢	3.275¢	3.275¢		3.275¢	3.275¢		3.375¢	3.275¢		3.925¢	3.375¢	3.615¢	3.635¢
Galvanized (24 gage)	4.05¢	4.05¢	4.05¢		4.05¢	4.05¢	4.05¢	4.05¢	4.15¢	4.05¢		4.60¢		4.31¢	4.24¢
Enameling (20 gage)	3.80¢	3.80¢	3.80¢	3.80¢			3.80¢		3.90¢	3.80¢		4.45¢	3.90¢	4.20¢	4.16¢
Enameling (10 Gage)	3.20¢	3.20¢	3.20¢	3.20¢			3.20¢		3.30¢	3.20¢		3.85¢	3.30¢	3.60¢	3.56¢
Long ternes [2]	4.05¢	4.05¢	4.05¢									4.80¢		4.45¢	4.41¢
STRIP Hot-rolled [3] 6 in. and under	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢		2.45¢			2.45¢		3.10¢	2.55¢	2.85¢	2.81¢
Hot-rolled [3] over 6 in.	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢		2.35¢			2.35¢		3.00¢	2.45¢	2.75¢	2.71¢
Cold-rolled [4]	3.05¢	3.15¢		3.05¢			3.05¢	(Worcester=3.25¢)					3.15¢	3.45¢	3.41¢
Cooperage stock	2.55¢	2.55¢			2.55¢		2.55¢							2.95¢	
TINPLATE Standard cokes, base box	$5.00	$5.00	$5.00		$5.10			$5.10	$5.10					$5.375	$5.301
Electro, box 0.25 lb	$4.35	$4.35	$4.35					$4.35							
Electro, box 0.50 lb	$4.50	$4.50	$4.50					$4.60	$4.60						
Electro, box 0.75 lb	$4.65		$4.65					$4.75	$4.75						
BLACKPLATE 29 gage [5]	3.30¢	3.30¢	3.30¢					3.40¢	3.40¢					3.67¢	3.59¢
TERNES, MFG. Special coated, base box	$4.30	$4.30	$4.30					$4.40	$4.40						
BARS Carbon steel	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	(Duluth=2.60¢) (Provo, Utah=3.20¢)			2.85¢	3.15¢	2.60¢	2.84¢	2.86¢
Rail steel [6]	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢					2.85¢	3.15¢			
Reinforcing (billet) [7]	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢			2.70¢	2.75¢	2.45¢	2.61¢	2.69¢
Reinforcing (rail) [7]	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢				2.70¢	2.75¢	2.45¢		
Cold-finished [8]	3.10¢	3.10¢	3.10¢	3.10¢		3.10¢	(Detroit=3.15¢)			(Toledo=3.25¢)				3.44¢	3.46¢
Alloy, hot-rolled	2.92¢	2.92¢				2.92¢	2.92¢	(Bethlehem, Massillon, Canton=2.92¢)					3.02¢		
Alloy, cold-drawn	3.62¢	3.62¢	3.62¢	3.62¢		3.62¢							3.73¢		
PLATE Carbon steel [13]	(Coatesville and Claymont=2.50¢, Provo, Utah=3.20¢) 2.50¢	2.50¢	2.50¢	2.50¢	2.50¢		2.50¢	2.50¢			2.85¢	3.05¢	2.72¢	2.71¢	2.553¢
Floor plates	3.75¢	3.75¢									4.10¢	4.40¢		4.15¢	4.15¢
Alloy	3.79¢	3.79¢			(Coatesville=3.79¢)						4.27¢	4.49¢		4.01¢	3.895¢
SHAPES Structural	2.35¢	2.35¢	2.35¢		2.35¢	2.35¢	(Bethlehem=2.35¢)				2.60¢	3.00¢		2.54¢	2.43¢
SPRING STEEL, C-R 0.26 to 0.50 carbon	2.80¢			2.80¢			(Worcester=3.20¢)								
0.51 to 0.75 carbon	4.30¢			4.30¢			(Worcester=4.50¢)								
0.76 to 1.00 carbon	6.15¢			6.15¢			(Worcester=6.35¢)								
1.01 to 1.25 carbon	8.35¢			8.35¢			(Worcester=8.55¢)								
WIRE [9] Bright [12]	3.05¢	3.05¢		3.05¢	3.05¢		(Worcester=3.15¢)		(Duluth=3.10¢)			3.55¢		3.44¢	3.41¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.00¢	4.00¢		4.00¢			(Worcester=4.10¢)			(Trenton=4.25¢)		4.50¢		4.39¢	4.339¢
PILING Steel sheet	2.65¢	2.65¢				2.65¢						3.20¢		2.99¢	3.01¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

BASING POINT	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	24.67	17.01	17.47	20.69	25.29
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	22.99	24.67	17.01	17.47	20.69	25.29
Billets P'gh, Chi, Canton, Newark, N. J., Watervliet, Syracuse, Balt.	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh Chi, Canton Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse, Newark, N. J., Ft. Wayne, Titusville	22.99	24.67	17.01	17.47	20.69	25.29
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.05	25.97	20.02	20.56	24.34	29.75
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	27.05	25.97	20.02	20.56	24.34	29.75
Plates, P'gh, Middletown, Canton	31.38	29.21	23.28	23.80	28.67	33.00
Shapes, structural, P'gh, Chi	27.05	25.97	20.02	20.56	24.34	29.75
Sheets, P'gh, Chi, Middletown, Canton, Balt.	38.95	36.79	28.67	31.38	35.16	38.49
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.43	23.28	18.39	18.93	25.97	37.87
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.46	30.30	23.80	24.34	34.62	56.26
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila.	27.05	25.97	20.02	20.56	24.34	29.75
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.46	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Newark, N. J., Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton, (4 in. to 6 in.)	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, O.)*

An increase of 8.2 pct applies to base price and extras

	Base per lb
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57½¢
High-carbon-chromium*	43¢
Oil hardening*	24¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	per lb
Field grade	3.90¢
Armature	4.25¢
Electrical	4.75¢
Motor	5.425¢
Dynamo	6.125¢
Transformer 72	6.625¢
Transformer 65	7.625¢
Transformer 58	8.125¢
Transformer 52	8.925¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo. Pacific ports add 75¢ per 100 lb on all grades.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., net ton	$43.39
Angle splice bars, 100 lb	2.85
(F.o.b. basing points)	*per net ton*
Light rails (from billets)	$49.18
Light rails (from rail steel)	49.18
	base per lb
Cut spikes	3.65¢
Screw spikes	5.55¢
Tie plate, steel	2.55¢
Tie plates, Pacific Coast	2.70¢
Track bolts	6.50¢
Track bolts, heat treated, to railroads	6.75¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25¢.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$8.50	$17.00
15-lb coating I.C.	9.50	19.00
30-lb coating I.C.	10.00	20.00

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Pa.	21.00*	22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	18.72	....
Inconel-clad		
10 pct. f.o.b. Coatesville	26.00	....
Monel-clad		
10 pct. f.o.b. Coatesville	24.96	....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the dealer, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
	base per keg	
Standard wire nails	$3.75	$4.25
Coated nails	3.75	4.25
Cut nails, carloads	4.85	....
	base per 100 lb	
Annealed fence wire	$3.50	$4.00
Annealed galv. fence wire	3.85	4.35
	base column	
Woven wire fence*	72	90
Fence posts, carloads	74	91
Single loop bale ties††	72	97
Galvanized barbed wire**	79	89
Twisted barbless wire	79	89

*15½ gage and heavier. **On 80-rod spools in carload quantities.
†Prices subject to switching or transportation charges.
††Add 50c a ton.

HIGH TENSILE, LOW ALLOY STEELS

base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	Hi Steel	Mayari R	Otis-coloy	Yoloy	Y-50
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	American Rolling Mill
Plates	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	.....
Sheets									
Hot-rolled	3.575	3.575	3.575	3.575	3.575	3.575	3.575	3.575	.....
Cold-rolled	4.525	4.525	4.525	.....	4.525	4.525	4.525	4.525	5.225*
Galvanized	.....	.....	.....	.....	.....	5.50	.....	.....	.....
Strip									
Hot-rolled									
Over 6-in.	3.60	3.60	3.60	.....	3.60	3.60	3.60	3.60	.....
6-in & under	3.70	3.70	3.70	.....	3.70	3.70	3.70	3.70	.....
Cold-rolled	4.30	.....	4.30	.....	4.40	.....	4.30	4.30	5.00*
Commodity	.....	.....	.....	.....	.....	.....	4.45	.....	.....
Shapes	.....	3.45	.....	.....	3.45	3.45	3.45	3.45	.....
Beams	.....	3.45	.....	.....	.....	3.45	.....	.....	.....
Bars									
Hot-rolled	3.70	3.70	3.70	.....	.....	3.70	3.70	3.733†‡	.....
Cold-rolled	.....	.....	.....	.....	.....	.....	.....	4.382†‡	.....
Bar shapes	.....	3.85	.....	.....	3.85	3.85	3.85	3.85	.....
Billets, blooms, slabs (per gross ton)									
Structural	.....	.....	.....	.....	.....	.....	.....	$74.66†	.....
Forging	.....	.....	.....	.....	.....	.....	.....	$82.23†	.....

* 21 gage and lighter. † Alloy extras apply. ‡ Add 0.379¢ for forging grade, heat treated.

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills

(F.o.b. Pittsburgh only on wrought pipe) base price—$200.00 per net ton

Steel (buttweld)

	Black	Galv.
½-in.	60½	48
¾-in.	63½	52
1-in. to 3-in.	65½	54½

Wrought Iron (buttweld)

½-in.	17⅞	+4⅜
¾-in.	24¼	2⅝
1-in. and 1¼-in.	28⅝	9⅛
1½-in.	33	11⅞
2-in.	32⅝	11⅝

Steel (lapweld)

2-in.	58	46½
2½-in. and 3-in.	61	49½
3½-in. to 6-in.	63	51½

Wrought Iron (lapweld)

2-in.	24⅞	4⅞
2½-in. to 3½-in.	25⅞	7½
4-in.	28⅛	11⅝
4½-in. to 8-in.	27	10¼

Steel (butt, extra strong, plain ends)

½-in.	58½	47½
¾-in.	62½	51½
1-in. to 3-in.	64	54

Wrough. Iron (same as above)

½-in.	18⅞	+1⅝
¾-in.	25⅝	4¾
1-in. to 2-in.	33	13

Steel (lap, extra strong, plain ends)

2-in.	56	45½
2½-in. and 3-in.	60	49½
3½-in. to 6-in.	63½	53

Wrought Iron (same as above)

2-in.	28⅛	8⅝
2½-in. to 4-in.	34	16¼
4½-in. to 6-in.	32⅝	14⅝

On buttweld and lapweld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lapweld and one point lower discount, or $2 a ton higher on all buttweld.

BOILER TUBES

Seamless steel and lapweld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots

	Seamless Cold-Drawn	Seamless Hot-Rolled	Lapweld, Hot-Rolled
2 in. O.D. 13 B.W.G.	16.52	13.90	13.20
2½ in. O.D. 12 B.W.G.	22.21	18.70	17.67
3 in. O.D. 12 B.W.G.	24.71	20.79	19.56
3½ in. O.D. 11 B.W.G.	31.18	26.25	24.68
4 in. O.D. 10 B.W.G.	38.68	32.56	30.55

(Extras for less carload quantities)

40,000 lb or ft and over	Base
30,000 lb or ft to 39,999 lb or ft.	5 pct
20,000 lb or ft to 29,999 lb or ft.	10 pct
10,000 lb or ft to 19,999 lb or ft.	20 pct
5,000 lb or ft to 9,999 lb or ft.	30 pct
2,000 lb or ft to 4,999 lb or ft.	45 pct
Under 2,000 lb or ft.	65 pct

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in., del'd Chicago	$70.33
6-in. to 24-in., del'd New York	69.60
6-in. to 24-in., Birmingham	61.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles or Seattle for all rail shipment; rail and water shipment less	84.40

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

An increase of 12 pct applies to listings except Large Rivets

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

	Percent Off List
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less keg lots		
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 in. through 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full keg lots, 10 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

	Consumer
Packages, nuts loose	71 and 10
In packages	71
In bulk	80

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$4.75
F.o.b. Lebanon, Pa.	4.90

Small Rivets

(7/16 in. and smaller)

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws *(In packages)*	*Percent Off List* Consumer
Upset full nn, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Effective CaF_2 Content:	Base price per short ton
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports*)

	Per Gross Ton
Old range, bessemer	$5.45
Old range, non-bessemer	5.30
Mesaba, bessemer	5.20
Mesaba, non-bessemer	5.05
High phosphorus	5.05

Prices are for ore shipped on and after June 24, 1946, and for ore covered by adjustable pricing agreements authorized by Order No. 8, RMPR 113.

These prices do not reflect the recent ICC increase in freight rates.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh	19¼¢ to 21½¢
Copper, electrolytic, 100 and 375 mesh	23½¢ to 27½¢
Copper, reduced, 150 and 200 mesh	22⅝¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe	11¢ to 16¢
Swedish sponge iron, 100 mesh, c.i.f. N. Y., carlots, Ocean bags	7.4¢ to 8¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	4¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots	63¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe	25¢ to 31¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	17¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢ to $1.75
Aluminum, 100, 200 mesh, carlots	25¢
Antimony, 100 mesh	30¢
Cadmium, 100 mesh	$1.75
Chromium, 100 mesh and finer	$1.25
Lead, 100, 200 & 300 mesh	13¼¢ to 16¾¢
Manganese, minus 325 mesh and coarser	44¢ to 61¢
Nickel, 150 mesh	51½¢
Silicon, minus 325 mesh and coarser	26¢ to 55¢
Solder powder, 100 mesh	8½¢ plus metal
Tin, 100 mesh	58¾¢
Tungsten metal powder, 98%-99%, any quantity, per lb	$2.60
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb	$2.65
Under 100 lb	$2.90

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$8.75
Connellsville, Pa., hand drawn	9.35
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	8.50
Foundry, Byproduct	
Chicago, del'd	15.10
Chicago, f.o.b.	14.35
New England, del'd	16.04
Kearny, N. J., f.o.b.	14.40
Philadelphia, del'd	14.63
Buffalo, del'd	14.75
Portsmouth, Ohio, f.o.b.	12.85
Painesville, Ohio, f.o.b.	13.50
Erie, del'd	14.50
Cleveland, del'd	14.55
Cincinnati, del'd	14.60
St. Louis, del'd	15.10†
Birmingham, del'd	12.25

†Except producers situated in states other than Missouri, Alabama or Tennessee, sellers may charge a maximum delivered price of $15.60 in the St. Louis Mo., and East St. Louis, Ill., switching districts.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Per 1000
Super-duty brick, St. Louis	$76.05
First quality, Pa., Md., Ky., Mo., Ill., Ohio	60.40
First quality, New Jersey	65.90
Sec. quality, Pa., Md., Ky., Mo., Ill.	54.80
Sec. quality, New Jersey	57.70
Sec. quality, Ohio	52.95
Ground fire clay, net ton, bulk	8.95

Silica Brick

Pennsylvania and Birmingham	$60.40
Chicago District	69.30
Silica cement, net ton (Eastern)	10.60

Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$54.00

Magnesite Brick

Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks	$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk	22.00
in sacks	26.00

Clinker (dead burned) dolomite, per ton East, $9.30; Midwest, add 10¢; Mo. Valley, add 20¢.

WAREHOUSE PRICES

Delivered metropolitan areas, per 100 lb.

Cities	SHEETS			STRIP			Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
				Hot-Rolled										
	Hot-Rolled (10 gage)	Cold-Rolled	Galvanized (24 gage)	6 in. and Under	Over 6 in.	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A-8617-20	Hot-Rolled, A-8742-50 Ann.	Cold-Drawn, A-8617-20	Cold-Drawn, A-8742-50 Ann.
**Philadelphia	$3.743	$5.097	$5.218a	$4.272	$4.172	$5.022	$3.855	$3.916	$4.072	$4.522	$6.016	$7.116	$7.372	$8.422
New York	3.815	4.838[1]	5.46	4.324	4.224	5.024	4.018	4.008	4.103	4.553	6.058	7.158	7.403	8.453
Boston	3.999	4.969[3]	5.674	4.456	4.356	4.965	4.162	4.162	4.294	4.594	6.212	7.312	7.444	8.494
Baltimore	3.619	5.077	5.344	4.252	4.152	....	3.844	4.009	4.052	4.502	6.109	7.209	7.352	8.402
Norfolk	3.996	....	5.821	4.515	4.415	....	4.221	4.252	4.315	4.615	....	....	....	....
Chicago	3.475	4.425	5.581	3.95	3.85	4.90[6]	3.80	3.80	3.75	4.20	5.80	6.90	....	8.00
Milwaukee	3.612	4.562[1]	5.537	4.087	4.077	5.037[6]	3.937	3.937	3.887	4.337	6.037	7.037	7.187	8.237
Cleveland	3.575	4.625	5.327	3.95	3.85	4.70[6]	3.65	3.838	3.60	4.20	6.006	7.106	6.95	8.00
Buffalo	3.575	4.625	5.20	4.169	4.109	4.959[6]	3.92	3.65	3.60	4.20	5.80	6.90	6.95	8.00
Detroit	3.675	4.725	5.45	4.05	3.95	....	3.859	3.911	3.70	4.25	6.13	7.23	7.55	8.65
Cincinnati	3.65	4.70[1]	5.275	4.025	3.925	4.961	3.911	3.941	3.861	4.461	6.15	7.25	7.311	8.65
St. Louis	3.622	4.572[1]	5.581	4.097	3.997	5.181[6]	3.947	3.947	3.897	4.481	6.181	....	7.331	....
Pittsburgh	3.575	4.625	5.20	3.95	3.85	4.70	3.65	3.65	3.60	4.20	5.80	6.90	6.95	7.95
St. Paul	3.797	4.747	5.635	4.272	4.172	5.352	4.122	4.122	4.072	4.811	6.202	6.302	7.352	7.402
Omaha	4.045	5.72	6.00	4.52	4.42	....	4.37	4.37	4.32	4.945	....	....	....	....
Indianapolis	3.745	4.795	5.37	4.12	4.02	4.99	3.88	3.88	3.83	4.43	6.13	....	7.28	....
Birmingham	3.675	....	5.20	4.05	3.95	....	3.80	3.80	3.75	4.903	....	....	....	....
Memphis	4.19	4.885	5.715	4.565	4.465	....	4.315	4.315	4.265	4.78	....	....	....	....
New Orleans	4.283*	5.304	5.808	4.658	4.558	....	4.408	4.408*	4.358*	5.079	....	....	....	....
Houston	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Los Angeles	4.85	6.60[1]	6.55	5.30	5.20	....	4.80	4.70	4.65	6.03	....	....	....	....
San Francisco	4.12	6.87	6.35	4.60	4.50	4.15	4.15	4.15	4.30	5.78	....	....	....	....
Seattle	4.87[5]	7.27[2]	6.40	4.60	4.50	....	5.00[5]	4.70[5]	4.60[5]	6.23	....	....	....	....
Portland	4.87[4]	6.82[2]	6.20	5.10	5.00	....	5.00[4]	4.70[4]	4.70[4]	5.98	8.15	....	9.20	....
Salt Lake City	4.75	....	6.62[7]	5.88	5.78	....	5.23[7]	5.23[7]	5.13	6.35	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars, 1500 lb base.

NE ALLOY BARS: 1000 to 39,999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 450 to 3749 lb; (4) 300 to 4999 lb; (5) 300 to 19,000 lb; (6) 2000 lb and over; (7) 3500 lb and over.

(a) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

* Add 0.271¢ for sizes not rolled in Birmingham.

** City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

PIG IRON PRICES

Per gross ton, retroactive to May 29.

BASING POINT PRICES						DELIVERED PRICES (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	29.00	29.50	30.00	30.50	.....	Boston	Everett	$0.50 Arb.	29.50	30.00	30.50	31.00	.....
Birdsboro	29.00	29.50	30.00	30.50	34.00	Boston	Birdsboro-Steelton	4.47	.....	.....	.....	.....	38.47
Birmingham	23.50*	24.88*	.....	29.50	.....	Brooklyn	Bethlehem	2.78	31.78	32.28	32.78	33.28	.....
Buffalo	27.50	28.50	29.00	29.50	34.00	Brooklyn	Birdsboro	3.26	.....	.....	.....	.....	37.26
Chicago	28.00	28.50	28.50	29.00	.....	Canton	Clev. Ygstn, Sharpsvil.	1.54	29.54	30.04	30.04	30.54	.....
Cleveland	28.00	28.50	28.50	29.00	.....	Canton	Buffalo	3.55	.....	.....	.....	.....	37.55
Detroit	28.00	28.50	28.50	29.00	.....	Cincinnati	Birmingham	4.30	27.80*	29.18*	.....	.....	.....
Duluth	28.50	29.00	29.00	29.50	.....	Cincinnati	Hamilton	1.24	.....	.....	29.74	.....	.....
Erie	28.00	28.50	29.00	29.50	.....	Cincinnati	Buffalo	4.89	.....	.....	.....	.....	38.89
Everett	29.00	29.50	30.00	30.50	.....	Jersey City	Bethlehem	1.70	30.70	31.20	31.70	32.20	.....
Granite City	28.00	28.50	28.50	29.00	.....	Jersey City	Birdsboro	2.16	.....	.....	.....	.....	36.16
Hamilton	28.00	28.50	28.50	.....	.....	Los Angeles	Provo	5.25	31.25	31.75	.....	.....	.....
Neville Island	28.00	28.50	28.50	29.00	.....	Los Angeles	Buffalo	16.33	.....	.....	.....	.....	50.33
Provo	26.00	26.50	.....	.....	.....	Mansfield	Cleveland-Toledo	2.16	30.16	30.66	30.66	31.16	.....
Sharpsville	28.00	28.50	28.50	29.00	.....	Mansfield	Buffalo	3.74	.....	.....	.....	.....	37.74
Sparrows Point	29.00	29.50	.....	.....	.....	Philadelphia	Swedeland	0.93	29.93	30.43	30.93	31.43	.....
Steelton	29.00	.....	.....	.....	34.00	Philadelphia	Birdsboro	1.38	.....	.....	.....	.....	35.38
Swedeland	29.00	29.50	30.00	30.50	.....	San Francisco	Provo	5.25	31.25	31.75	.....	.....	.....
Toledo	28.00	28.50	28.50	29.00	.....	San Francisco	Buffalo	16.33	.....	.....	.....	.....	50.33
Youngstown[1]	28.00	28.50	28.50	29.00	.....	Seattle	Provo	5.25	31.25	31.75	.....	.....	.....
						Seattle	Buffalo	16.33	.....	.....	.....	.....	50.33
						St. Louis	Granite City	0.50 Arb.	28.50	29.00	29.00	29.50	.....
						St. Louis	Buffalo	7.86	.....	.....	.....	.....	41.86

* Republic Steel Corp. has been granted a $2 increase on basic and foundry pig iron produced at Birmingham.

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, $33.00 and $34.00, respectively. Newberry Brand of Lake Superior charcoal iron $39.00 per g.t., f.o.b. furnace. Delivered to Chicago, $42.34.

High phosphorus iron sells at Lyles, Tenn., at $28.50.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorous content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron, silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$34.00; f.o.b. Buffalo—$35.25. Add $1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for prices of comparable analysis.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	148.50
F.o.b. Pittsburgh	139.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	6.05	6.30	6.60
Ton lots	6.65	7.55	8.55
Less ton lots	6.80	7.80	8.80

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$35.00	$36.00
Less ton	47.50	48.50
F.o.b. Pittsburgh, Chicago	40.00	

Manganese Metal

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30
L.c.l. lots	32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.10% max. C, 0.06% P, 90% Mn	21.00	21.40	21.65
0.10% max. C	20.50	20.90	21.15
0.15% max. C	20.00	20.40	20.65
0.30% max. C	19.50	19.90	20.15
0.50% max. C	19.00	19.40	19.65
0.75% max. C, 7.00% max. Si	16.00	16.40	16.65

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05
Ton lots	6.70
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet.	5.80
Ton lots	6.30
Less ton lots	6.55

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $51.25 f.o.b. Keokuk, Iowa; $48.00 f.o.b. Jackson, Ohio; $49.25 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots, packed.

	Eastern	Central	Western
96% Si, 2% Fe	13.10	13.55	16.50
97% Si, 1% Fe	13.45	13.90	16.80

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si.

	Eastern	Central	Western
Carload, bulk	3.60	3.75	3.90
Ton lots	4.05	4.55	4.60
Less ton lots	4.45	4.80	4.85

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
50% Si	7.05	7.50	7.65
75% Si	8.55	8.70	9.25
80-90% Si	9.50	9.65	10.15
90-95% Si	11.80	11.95	12.40

Ferrochrome

(65-72% *Cr*, 2% *max. Si*)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00	23.40	24.00
0.10% C	22.50	22.90	23.50
0.15% C	22.00	22.40	23.00
0.20% C	21.50	21.90	22.50
0.50% C	21.00	21.40	22.00
1.00% C	20.50	20.90	21.50
2.00% C	19.50	19.90	20.50
66-71% Cr, 4-10% C	14.50	14.90	15.00
62-66% Cr, 5-7% C	15.05	15.45	15.55

Briquets—contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	9.20	9.50	9.90
Ton lots	9.80	10.30	11.80
Less ton lots	10.10	10.60	12.10

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low-carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N. High-carbon type: 66.71% Cr, 4-5% C, 0.75% N. Add 5¢ per lb to regular high-carbon ferrochrome price schedule.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	15.60	16.00	16.10
Ton lots	16.65	17.30	18.50
Less ton lots	17.30	17.95	19.15

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	20.00	20.40	21.00
Ton lots	21.00	21.65	22.85
Less ton lots	22.00	22.65	23.85

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed. 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Chromium—Copper

Contract price, cents per pound of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si.

Shot or ingot	45¢

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	13.00	13.50	15.55
Ton lots	14.50	15.25	17.40
Less ton lots	15.50	16.25	18.40

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50	16.00	18.05
Ton lots	16.50	17.35	19.10
Less ton lots	17.00	17.85	19.60

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1¢ for central zone; 5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	$1.35	$1.75	$4.25
Less ton lots	1.60	2.00	5.00

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

	Eastern	Central	Western
Ton lots	12.00	12.75	14.75
Less ton lots	12.50	13.25	15.25

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	11.75	12.50	14.50
Less ton lots	12.25	13.00	15.00

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe.

	Eastern	Central	Western
Ton lots	12.00	12.85	14.60
Less ton lots	12.50	13.35	15.10

Other Ferroalloys

Ferrotungsten, standard, lump or ¼X down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained T, 5 ton lots, freight allowed	$1.88
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.	
Openhearth	$2.70
Crucible	$2.80
High speed steel (Primos)	$2.90
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5	$1.10
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb.	
Ton lots	$2.25
Less ton lots	$2.30
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	95¢
Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo	80¢
Ferrotitanium, 40-45%, 0.10%C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Less ton lots	$1.25
Ferrotitanium, 20-25%, 0.10%C max., ton lots, per pound contained Ti	$1.35
Less ton lots	$1.40
High-carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads	$142.50
Ferrophosphorus, 18%, electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, Electrolytic, 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	14¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	
Carload, bulk	4.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload	5.75¢
Ton lots	7.25¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Car lots	8.00¢
Ton lots	8.75¢
Less ton lots	9.25¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.329

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

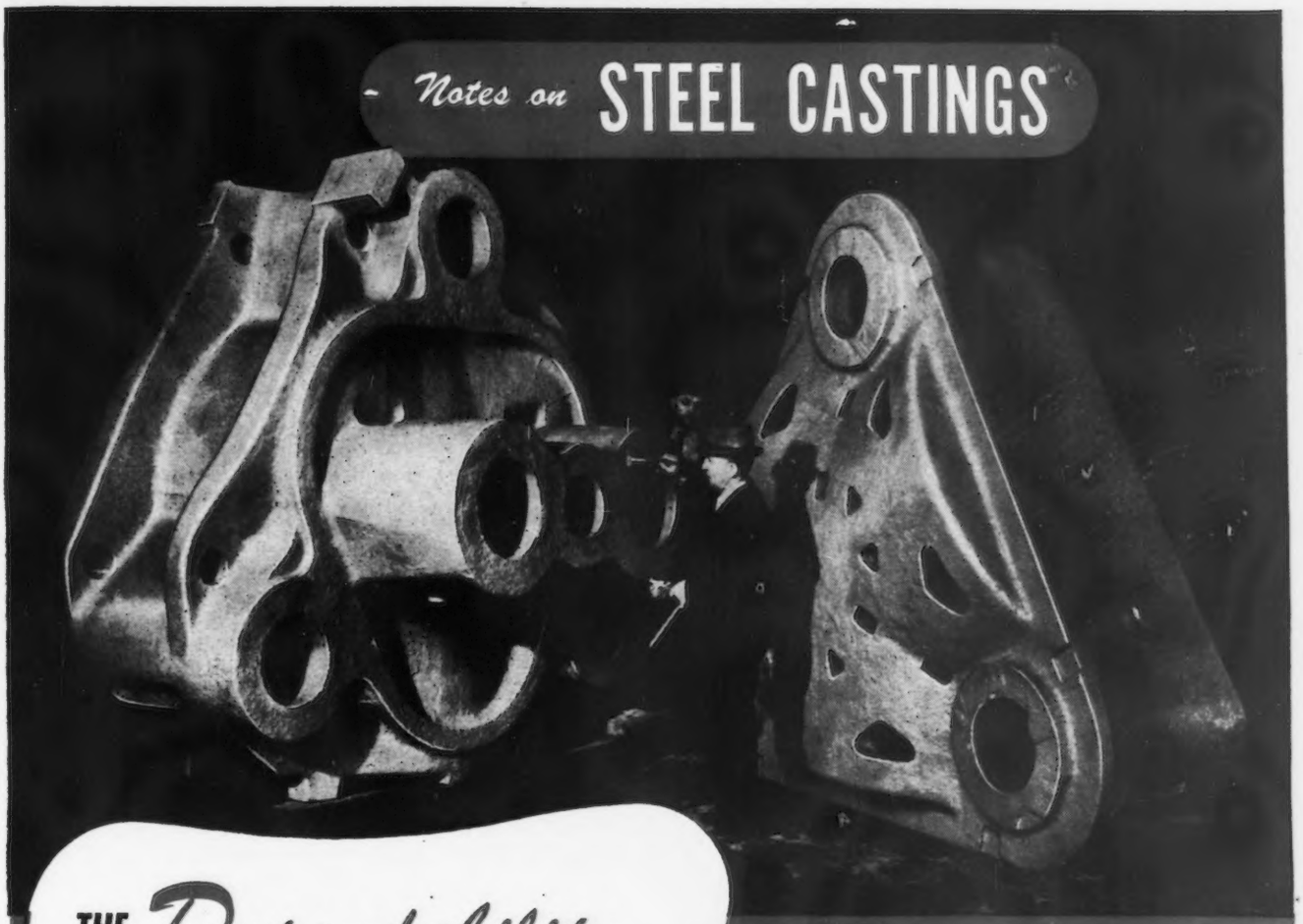
Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$2.10	$2.1125 $2.1445

Silcaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
carload lots	25¢
Ton lots	26¢
Silvaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	58¢
Ton lots	59¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.	
No. 1	87.5¢
No. 6	60¢
No. 79	45¢
Bortram, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Notes on STEEL CASTINGS



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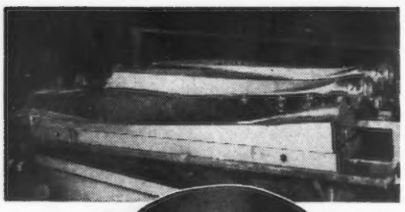

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Domestic Coke Use Declines; Exports Stage Sharp Gain in 1945

New York

• • • **The production and** distribution of byproduct and beehive coke in the United States dropped sharply in 1945 according to a recent study made by the Bureau of Mines. The decline was caused by bituminous coal mine stoppages in October which curtailed shipments of coal to coke plants, failure of old byproduct coke oven batteries which had been pushed hard during the war, and to the closing down of a number of beehive coke plants because of labor difficulties and a lack of coal. As a consequence, total consumption of coke in the United States in 1945 decreased 9 pct from the peak attained in 1944 to 66,448,258 short tons.

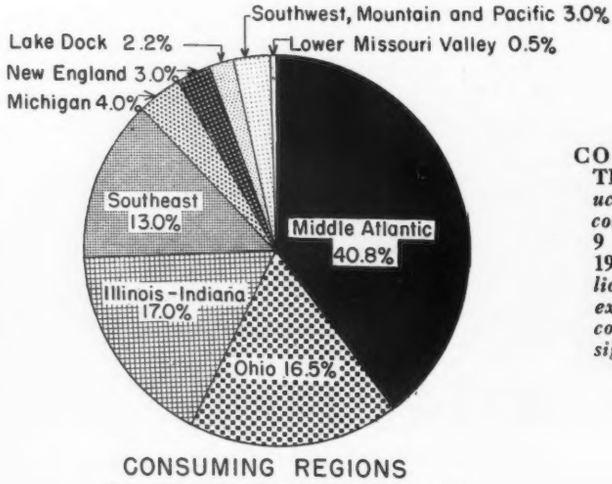
Although consumption of large coke showed a sharp decline, the quantity of coke breeze or screening distributed within the United States increased 3 pct in the same period and totaled 5,320,257 tons.

Shipments of coke and coke breeze to foreign countries, as reported by the producers, registered large increases and were 31 pct and 68 pct, respectively, above the quantities exported in 1944.

Utilization of large coke in blast furnaces in 1945 constituted nearly 76 pct of the total deliveries but the tonnage involved was 11 pct below that of 1944. The decline in consumption of coke for furnace use was general throughout the United States ranging from 3 pct in Texas to 21 pct in Minnesota. The blast furnace at Everett, Mass., ceased operation in the latter part of 1944 and, therefore, Massachusetts dropped from the list of states consuming blast-furnace coke in 1945. A slight increase was recorded in shipments to iron foundries in the United States and foreign shipments of foundry coke increased 59 pct in the same period.

The domestic coke trade received 10 pct of the byproduct and beehive coke, excluding breeze, distributed in 1945 and although shipments of domestic coke within the United States dropped slightly from the 1944 deliveries, exports offset this slight decrease and total deliveries were 57,965 tons higher than for the preceding year. Total deliveries of domestic coke, however, were far below the prewar tonnage of 1940 and were 33 pct less than for 1936, when domestic coke shipments were the highest ever reported in these surveys. The use of coke in the manufacture of producer gas, water gas, and other industrial uses (non-ferrous smelting, lime burning, etc.), in 1945 varied only slightly from the combined total of these uses in 1944, and the tonnage was equivalent to 10 pct of the total coke distribution, the same proportion that was so used in 1944.

The consumption of coke, by states, in 1945, followed in general



CONSUMING REGIONS
(excluding imported coke and breeze)

o o o

COKE CONSUMPTION: *Total byproduct and beehive coke consumption declined 9 pct in 1945 from 1944's peak of 66.5 million tons. Meanwhile, exports of coke and coke breeze increased significantly.*

o o o

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The new building of the American Stone Company in St. Louis will have an electrically controlled car suspended from the roof for washing windows.

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A plastic molding press weighing 17 lbs. and costing about $30 is offered by N. R. K. Manufacturing & Engineering Company of Chicago.

get ready with CONE for tomorrow

International Business Machines has a 6-key Braille typewriter and will give away the first thousand to blind veterans.

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Du Pont has announced a new, improved translucent "metallic" lacquer for automobiles called "Metalli-Chrome"

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Two former military pilots have established American Flyaway Service, at Dayton, Ohio, to deliver personal aircraft from manufacturers to dealers.

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On its longest over-water run, Oakland to Honolulu, Naval Air Transport Service is landing its planes within 18 minutes of their schedule.

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In the upholstery plant of Fisher Body, the annoyance and danger of static electricity was eliminated by humidification. An incidental benefit was reduced absence due to colds.

International Harvester is establishing a manufacturing research center with 350 men chosen from its plants all over the country.

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Westinghouse has a bacteriacidal ultra-violet lamp to insert in milk cans that reduces bacteria count 96% in one minute.

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The 6-mile canal dredged to supply the Dow magnesium plant at Velasco, Texas, with sea water is also serving as a freight artery.

get ready with CONE for tomorrow

Tucson Laundry Company has started twice-a-week laundry pick-up service by air over a distance of 60 miles.

"ENIAC", the electronic computor developed for the Ordnance Department, can do 100 man-hours of mathematical work in two hours. It is expected to revolutionize the mathematics of engineering.

get ready with CONE for tomorrow

American Optical Company has developed a sight-testing instrument which will make 14 vision tests in three minutes.

get ready with CONE for tomorrow

Beech Aircraft is developing a 6-passenger automobile with a 90-horsepower air-cooled engine that drives a generator powering separate electric motors on the wheels.

get ready with CONE for tomorrow

Martin Senour Company has developed a method of paint mixing that will produce 1000 tints with accuracy from 6 basic colors. The idea is being tested at a "paint bar" in a metropolitan department store.

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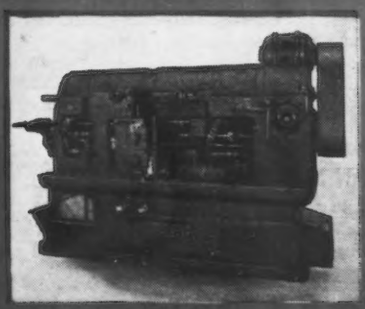

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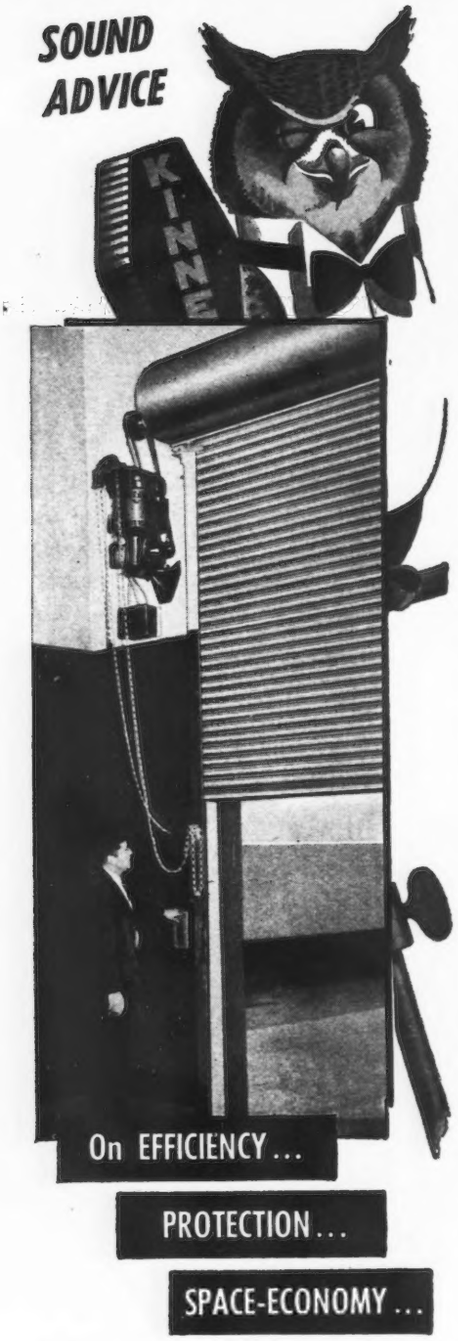

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the distribution pattern established in previous years. Although slight increases in consumption were recorded in a few of the minor consuming states, substantial decreases were registered in all of the principal consuming states, especially those dominated by blast furnace interests. The largest decrease in terms of tonnage was in Pennsylvania with a drop of 1,439,105 tons when compared with 1944, this state, however, maintained its position as the ranking state in coke usage accounting for 26 pct of the total. Ohio, with its large concentration of blast furnaces, ranked second and the total tonnage used for all purposes in this state was equivalent to 16 pct of the total used or sold by all producers. A decrease of more than a half million tons in blast furnace coke consumption in Indiana was not offset by increases in consumption for other purposes and this state yielded third place to New York. Although New York ranked third in total tonnage consumed, it was the leading user of domestic coke and accounted for 20 pct of all domestic coke deliveries.

The consumption of coke breeze, or screenings, in 1945, increased 3 pct over 1944 and was the highest ever reported. Screenings or breeze was used in 39 states, the District of Columbia, and nearly 60,000 tons were exported to two foreign countries. The low unit value of breeze does not justify long rail hauls and most breeze is consumed at or near producing plants chiefly for steam raising. The total tonnage shipped from producing plants in 1945 amounted to slightly more than one-fifth of the total quantity used or sold by producers. Of the total tonnage distributed in 1945, byproduct ovens supplied 98 pct, as very few beehive plants have equipment for the recovery of breeze. For this reason, the ranking byproduct coke producing states are the leading consumers of breeze and Pennsylvania, Ohio, New York, and Indiana used 50 pct of the total consumption in 1945.

Shipments of byproduct and beehive coke and breeze to foreign countries in 1945, as reported by producers, increased 33 pct over 1944 and were the highest since 1929. As in previous surveys, exports of coke reported by producers were considerably lower than the foreign shipments reported in official customs returns (1,478,746 tons in 1945) which include exports of reclaimed coke, as well as shipments by dealers and exporters, which are not included in this report. As will be noted in the following table, coke designated as "domestic" usually constitutes about 50 pct of the total shipments of large coke and is nearly all destined for Canada. Aside from Canada, which received 84 pct of the total exports in 1945, the foreign market for American coke is very small. In 1945, producers located in 14 states reported foreign shipments with Michigan, Pennsylvania, and New York accounting for 85 pct of the total. The comparative distribution, by major uses and principal destinations, of coke exports for the years 1940 and 1943-45 are shown below.

Byproduct and Beehive Coke and Breeze Exports By Producers

Uses	1940	1943	1944	1945
Furnace	81,627	60,276	17,862	31,094
Foundry	98,337	116,646	104,253	165,894
Other industrial, including water gas	190,317	198,135	180,681	257,066
Domestic	303,796	170,568	386,346	450,401
Breeze	46,498	97,486	35,517	59,663
	720,575	643,111	724,659	964,118

Destination	1940	1943	1944	1945
North America:				
Canada	640,888	610,280	678,008	805,371
Mexico	16,908	4,533	3,825	7,527
West Indies	24,299	8,133	30,842	33,902
Other North America	48	32	.....	.....
Central America	229	195	149	105
South America	6,173	12,742	8,960	8,277
Europe	14,350	.....	986	28,406
Africa	.....	.....	.....	609
Hawaii and the Philippines	3,132	.....	.....	.....
Unknown	14,548	7,196	1,889	79,921
	720,575	643,111	724,659	964,118

Oakite offers practical help to you in CLEANING or SURFACE CONDITIONING work or parts fabricated from STAINLESS STEEL

In plant after plant fabricating parts from stainless steel, the wide and successful use of Oakite materials designed for cleaning and conditioning surfaces, for use as coolants in machining and grinding operations or for neutralizing after pickling, has resulted in accumulating valuable experience, a small part of which is briefly referred to on this page.

If you are performing any of the operations described, our Technical Representative in your locality can be of service in submitting recommendations that should prove helpful in reducing unit cost and in obtaining improved results. Your problems invited and promptly answered.

Cleaning Stainless After MACHINING

Lubricants used in drilling, tapping, reaming, milling or other operations on stainless steel are easily and rapidly removed by various specialized Oakite cleaning materials used either in connection with dip tank, electro-cleaning method or in automatic washing machine. Enlist Oakite experience.

Cleaning Before ANNEALING

In drawing chromium nickel stainless, the lubricants used should be removed before annealing. Neglect to do this results in formation of a crusty scale. Dip tank, anodic or automatic washing machine cleaning with recommended Oakite materials does fast, low-cost job. In spinning stainless, same cleaning operation is good practice to remove spinning lubricants before work is annealed.

WET GRINDING Stainless

For keeping work cool and wheel free cutting in wet grinding, use Oakite Soluble Oil in recommended dilution. It provides a stable emulsion and may be used in a wide range of dilutions.

Cleaning Before BLACKENING

Before the application of color, blackening or similar chemical finishes to stainless steels, either for increasing corrosion resistance or appearance, or both, it is extremely important that all oil, grease, scale and other foreign matter be completely removed. Dip tank or automatic washing machine method, using recommended Oakite materials will help you do this work quickly, and economically.

Cleaning After Oil QUENCHING

Where oil quenching follows annealing, parts or work may be immersed in recommended Oakite cleaning solution to remove oil quickly and thoroughly to condition work for subsequent operation.

NEUTRALIZING Stainless After PICKLING

After acid pickling procedure to remove scale, thorough rinsing and neutralizing should follow. To help you handle this work on a fast, low-cost, efficient basis various performance-proved Oakite materials are available to put parts or work in prime condition for subsequent operation.

Oakite Products, Inc., 26 Thames Street, New York 6, N. Y.

Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE *Specialized* **CLEANING**

MATERIALS • METHODS • SERVICE

Plenty of Coolant...

where you want it
when you want it

...if you specify

RUTHMAN GUSHER COOLANT PUMP

Split second control of coolants from a trickle to full volume is just one of the many advantages that Gusher Coolant Pumps offer you in your metal cutting operations.

There is no priming, no packing, no leakage of coolants. When the Gusher is throttled you use less power.

So if you want a pump for your coolant system that will save both time and money, specify Ruthman Gusher Coolant Pumps on your machines.

MODEL TL-7320

WRITE NOW FOR OUR CATALOG

THE RUTHMAN MACHINERY CO.
1821 READING ROAD CINCINNATI 2, OHIO
THE "GUSHER"
A MODERN PUMP FOR MODERN MACHINE TOOLS

Labor Supply Up, Jobs Going Begging, Says USES Of Pennsylvania Area

Harrisburg

• • • **Recent labor market** developments, according to the United States Employment Service, show the beginning of a paradoxical situation wherein there are on one hand large numbers of unemployed veterans in a generally adequate overall labor supply, and, on the other hand, increasing numbers of occupations in which shortages are imminent.

The condition is the result of several factors: (1) Unnecessary rigidity of present employment specifications; (2) dislocation of workers stranded in war-industry communities; (3) wartime curtailment of technical and professional schools; (4) present immobility of workers because of housing shortages; (5) slow development of job training programs for new entrants; and (6) unattractiveness of current wages contrasted to wartime pay.

A review of the expected labor demands of metalworking industries reveals the following lines developing stringency: *PROFESSIONAL AND CLERICAL*—draftsmen, electrical and civil engineers, typists, stenographers, secretaries and bookkeepers; *TRADE AND SERVICE*—auto mechanics, auto body repairmen, sales clerks and salesmen. *METAL AND MACHINE TRADES*—machinists, molders, tool makers, die makers and core makers.

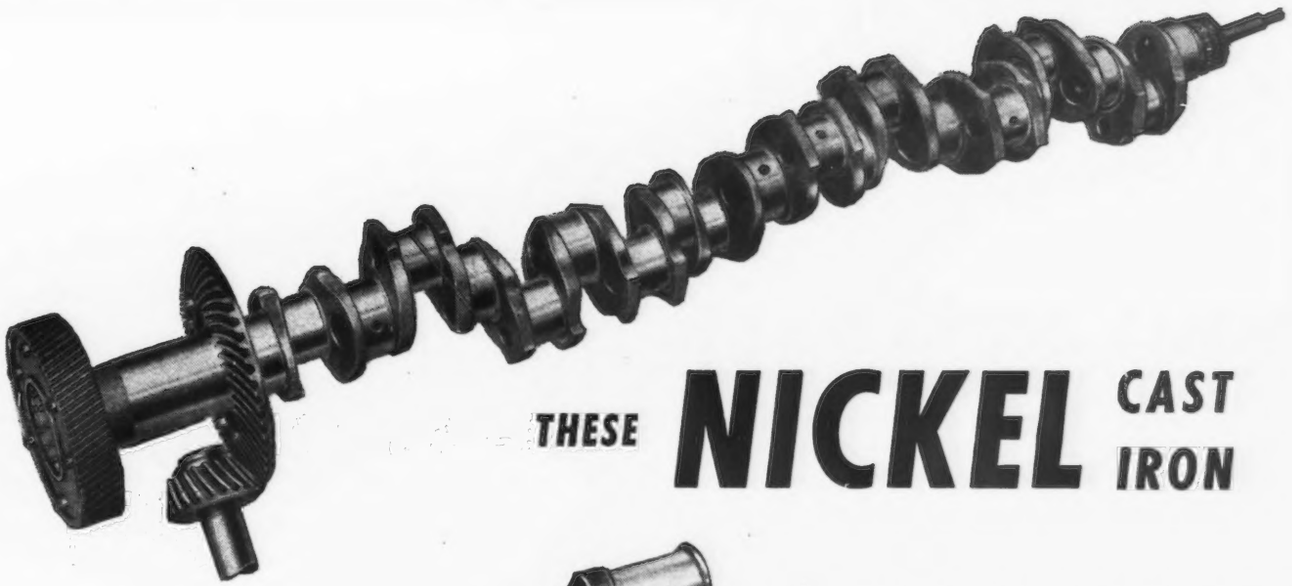
An analysis of the USES file of 360,000 job seekers now registered in various USES offices show the major problem is placement of young, inexperienced male workers—veterans and non-veterans.

USES recommends a relaxation of hiring specifications, especially with respect to age and experience requirements; expansion of training programs, such as apprenticeships, in-plant and school training courses; and the use of alternate and related skills.

•

Pittsburgh

• • • **Employment prospects** are apparently brighter in the Pittsburgh district, with male employment gaining, reemployment of veterans increasing, and female



THESE NICKEL CAST IRON CRANKSHAFTS provide:

★ **Low Notch Sensitivity**

★ **Excellent Vibration Damping**

★ **High Resistance to Fatigue**

Better performance at lower cost is the story behind the modern development of Nickel cast iron crankshafts.

Fairbanks, Morse & Company . . . a pioneer user of alloyed cast iron in this service . . . produces O-P Diesel engines equipped with cranks of the larger type shown above, cast in high test Nickel alloy iron that normally attains over 60,000 psi. tensile strength.

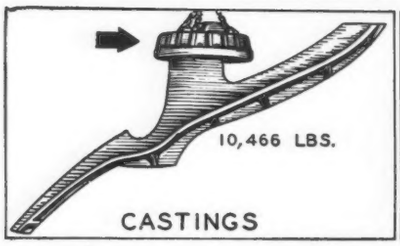
The smaller crank shown above is one of the types used in air compressors built by a national manufacturer.

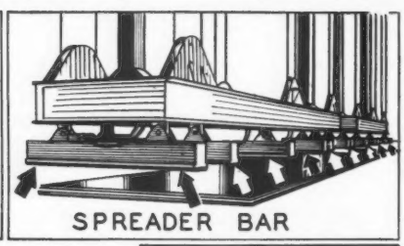
For parts such as crankshafts where sharp changes of section are unavoidable, the low notch sensitivity of cast iron recommends its use. It also provides excellent vibration damping properties. Absence of expensive dies and forging equipment, and the fact that castings require less machine tool time . . . point to the economy of using Nickel alloy irons.

These two crankshafts are indicative of the potentialities and wide scope of applications for high strength Nickel alloy cast irons.

Our casting specialists will be glad to consult with you and suggest where Nickel cast irons may be useful to you. Write us today.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 Wall Street New York 5, N. Y.





Lifting Magnets FOR ALL PURPOSES

You get definite saving of time and labor in moving material inside and outside of your plant with Stearns Lifting Magnets.

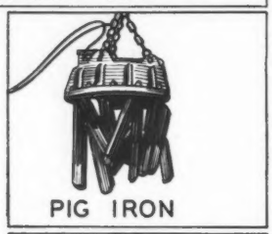
Will speed your loading and unloading operations—obviate hand labor on dangerous and difficult jobs—increase storage capacities—reduce your costs.

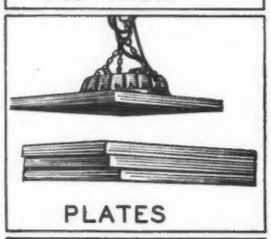
Stearns Magnets are being successfully and profitably used in handling scrap iron, loose or baled; steel plates, coils, bundles, strips; rails, slabs, billets, pig iron, castings, borings, turnings, finished products, etc., as well as for road and floor sweeping purposes. Can be installed on industrial crane trucks for out of the way spots not reached by overhead cranes.

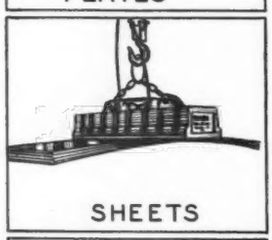
Stearns Magnets pay for themselves in a short time, require surprising little attention, are your best bet for economical, fast and safe moving of material.

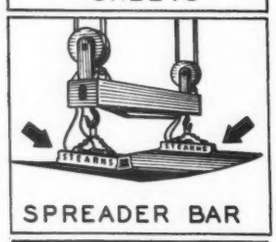
Let Stearns give you a lift with sturdy, dependable, low initial and operating cost magnets. Can be had in all practical sizes and shapes to suit your requirements.

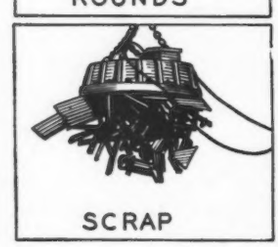
And—we can furnish Suspended Separation Magnets also in sizes and shapes to do your work.











MAGNETIC SEPARATORS
DRUMS
CLUTCHES
BRAKES

Stearns MAGNETIC MFG. CO.

635 So. 28th St.
MILWAUKEE 4, WIS.

employment at present firm, according to the local office of the United States Employment Service. At present, 88 pct of the working force in the area are men, 21 pct are World War II veterans; and 12 pct are women in firms employing 160,000 workers.

Steel and coal are expected to lead the employment rise. Increased mining activity and the present high rate of operations in steel are expected to be reflected in stepped up operations in other manufacturing industries in the area.

Due to shortages of materials and carpenters, the construction program in this area is uncertain. Extensive road and highway construction is now getting under way and will increase substantially in the near future. USES indicates semi-skilled and common labor is plentiful, but skilled crafts are expected to reveal inadequacies as the construction program progresses. The lack of full apprentice programs during the past 5 yr is the reason for the shortages that will develop in the skilled labor category.

During the past month, employment increased in Pittsburgh, Braddock, and New Kensington. Slight increases were noted in Carnegie. There are estimated to be 30,000 unemployed in Pittsburgh, 9100 in McKeesport, 8300 in Braddock, 3500 in New Kensington, and 2400 in Carnegie.

•

Cleveland

• • • **Industrial employment** here at the end of July was only 7 pct below that of July 1945, the last wartime month, according to a Cleveland Chamber of Commerce survey of employment in 100 plants, announced by J. W. Vandenbosch, Chamber business analyst.

Mr. Vandenbosch reported that at the end of July 1946, the 100 companies reported 107,038 employees on their payrolls and the same plants had 114,843 one year ago. The work week, however, currently is 41.6 hr, whereas last year at this time war production demands called for a 49.2-hr week.

"Efforts to retain war level take home pay are reflected in the hiring rate for labor (male) which at the end of July 1946, was 88¢ per hr, which is 20 pct above the 73.8¢ rate paid one year previous.

Right on the ball...

For a merchandising hole in one, make your product of stainless steel. Retailers love it because customers do.

Golf club heads that can't rust, kitchen ware that's always bright, flatware and cutlery that never needs polishing—the magic word "Stainless" sells consumer and industrial products equally fast. Don't let anybody say you can't fabricate stainless. Rustless engineers are right on the ball when it comes to solving production problems whenever they involve stainless steel. Remember, stainless is not difficult to work with, but just a little different.

We can help you cut costs of fabrication, show you the best grade of stainless to use for golf club heads, potato mashers, high pressure steam valves and a host of products. Write us about the Rustless electropolishing process—a new method of finishing. Rustless Iron and Steel Division, The American Rolling Mill Company, Baltimore 13, Maryland. Sales offices in principal cities, distributors everywhere.

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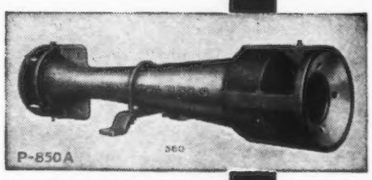
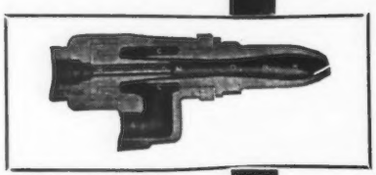
THERE'S A BURNER FOR YOUR JOB

The "AIROCOOL" Gas Burner, of the venturi type, produces a non-luminous flame with highest heat liberation. Its design permits: Low turndown without flame burnback; Maximum percentage of primary air-inspirated; Close adjustment of primary air-gas ratio with micrometer adjustment on air shutter; and gas orifice is easily removed or replaced. The TYPE SA Steam Atomizing Oil Burner (for use where steam or compressed air is available ***thoroughly atomizes*** and ***completely burns,*** the cheapest and lowest grades of fuel oil or tar, requiring low oil pressure and temperature. Internal atomizing venturi feature assures low steam consumption, and continuous operation without clogging or cleaning.



AIROCOOL GAS BURNER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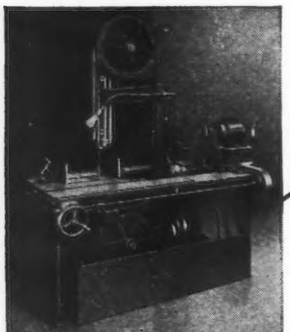
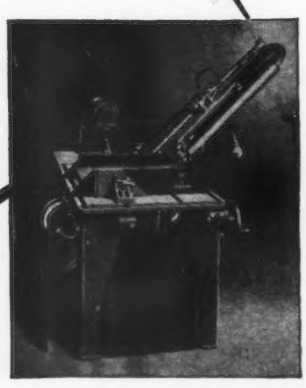


No other saw can do as much!

No Other Saw Can Do As Much! MARVEL Universal Band Saw, 18" x 18" capacity, will cut-off, slot, trim, mitre, notch, rough-out, or split bar stock, pipe, structural sections, mouldings, tubing, large standard blocks, or small irregular shapes with speed, ease, and convenience. Few shops working with metal can afford to be without this most versatile of all saws.

MARVEL SAWS

Mitre cutting is simple and accurate with the MARVEL Series 8 Band Saw. No change in position of work. Simply set the saw column at any required angle up to 45° either right or left of vertical. Do not confuse with any other "band saw." There is no other machine like the No. 8 MARVEL.



Complete Range of Metal Sawing Machines
Being the largest exclusive manufacturer of metal sawing machines and blades, both hack saw and band saw type, we have the correct answer to your cut-off problems. Each MARVEL model has a distinct application, so write us and we will send our catalog, price and recommendation for the saw to fill your requirements most efficiently. MARVEL sawing engineers are also available to discuss and analyze your cut-off work. (Without obligation of course)

ARMSTRONG-BLUM MFG. CO.
5700 W. Bloomingdale Ave., Chicago 39, Illinois, U.S.A.

Industrial Output In Japan Gains Slightly Despite Many Shortages

Washington

• • • **Despite continued** food, coal and raw material shortages, industrial production has shown a slight increase, according to General MacArthur's latest report on the economic recovery of Japan.

In all heavy industries, the coal shortage is the greatest obstacle to production. Present coal production is in the neighborhood of 1,750,000 metric tons a month against requirements of approximately 2½-million. In addition to lack of machinery, mine accidents are increasing under employee control.

Some increases in production during May were reported for iron and steel, lead, zinc and copper, but decreases were noted in most ferroalloys. The metallic manganese industry was stated to be at a virtual standstill, largely because of the coal shortage. Tin, nickel and antimony refineries were inactive during the month.

Five additional electric furnace steel producers resumed operations in May, however, and this is expected to increase production by about 4000 tons.

Machinery production rose slightly, it was reported, with production of new units and accessories now at about 42 pct of capacity. The increases included such mining equipment as testing and rock drills, digging machines, crushers, conveyors, etc. Makers of textile machinery have been devoting much time to repair of equipment and installation of machine tools.

"An annual aggregate capacity for manufacturing 27,000 units of machine tools will be left in Japan after the interim reparations selection has been made," the report declared. "This will make available about 50 pct of Japan's machine tool industry and represents about 20,000 installed machines in plants."

Aluminum ingot production has decreased somewhat to a production of about 715 tons with manufacture of heavy sheet items decreasing proportionately, although cast aluminum houseware showed a gain. The seven reduction plants

. . . with only 2 light coats

TITANIUM VITREOUS ENAMELING IRON

Recent production experience with Titanium enameling iron demonstrates . . . more clearly than ever before . . . the unique advantages of this new advance in the enameling industry.

With Titanium enameling iron—the cover coat, in white or color, is satisfactorily applied directly to the base metal. Ground coats are usually unnecessary when proper shop conditions are observed. As a result, production is doubled, often tripled—capacity boosted—and substantial savings effected.

In addition, products can be made with thin finishes superior to chipping and breaking. Resistance to thermal shock at high temperatures is retained. Service life is extended. There is no enamel boiling and little or no sagging or warping at enameling heats. For Titanium stabilizes (or fixes) the carbon in steel. Resultant carbonless iron, having no yield point, is especially satisfactory for deep drawing.

Both manufacturers of enamelware and steel find these and other features of this new Titanium enameling iron worth investigating. It's easy to get the facts. Our field engineers and research organization will welcome the opportunity to cooperate. Write today. There's no obligation, of course.

THE *Merit Mark* OF METAL

TAM ZIRCONIUM & TITANIUM PRODUCTS Registered U. S. Pat. Off.

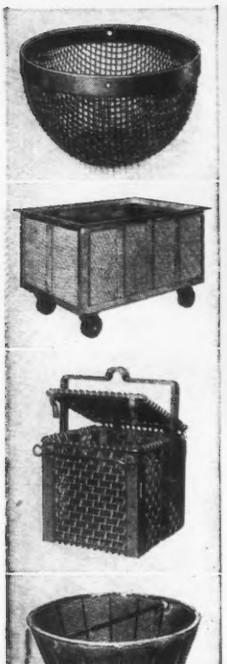
Pending patent applications on the new enameling process and products made thereby are owned jointly by Inland Steel Company and The Titanium Alloy Manufacturing Company under Trust Agreement.

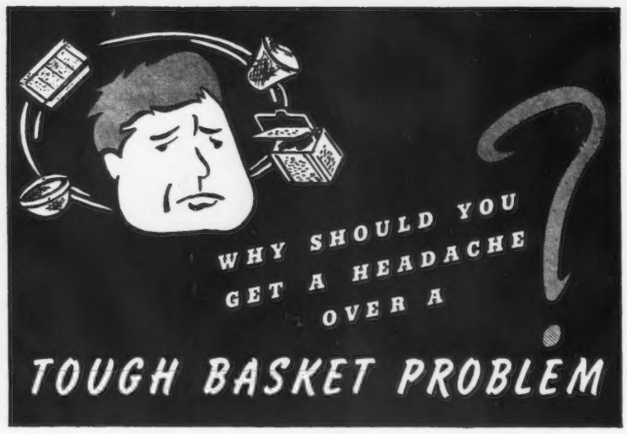
TAM

THE TITANIUM ALLOY MANUFACTURING COMPANY

Executive Offices: 111 BROADWAY, NEW YORK CITY *General Offices and Works:* NIAGARA FALLS, N. Y.

Largest Supplier of Titanium Compounds





Wrap up your sketches. Accompany them with as complete information as you can scrape together on size, capacity, type of service, conditions to be encountered, etc. Send them on to "Buffalo Wire."
Thousands of other basket "headaches" have been licked in just this way. Let "Buffalo Wire" tackle your metal basket problem, too. Profit by 76 years of turning out tailor-made designs for limitless uses. Capitalize on the modern, versatile facilities for producing any size, shape and weight.
Get a line on the scope of work produced in wire, wire cloth or expanded metal by writing for FOLDER 595. Twenty-two types of baskets are illustrated.

MANUFACTURER OF ALL KINDS
OF WIRE CLOTH SINCE 1869

Buffalo WIRE WORKS CO., INC.
ESTABLISHED 1869 AS SCHEELER'S SONS

456 TERRACE BUFFALO 2, N. Y.

ERIE BUCKETS

General Purpose
Dredging and Hard Digging
Dragline
Material Handlers
Hook-on Type
Ore Handling
Coal and Coke
4-Rope
Barge Type
Strayer Electric

Above types built in weights and capacities to suit your crane and job requirements.

THE COMPLETE LINE

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ERIE STEEL CONSTRUCTION CO.
ERIE, PENNSYLVANIA
Aggre Meters • Buckets • Concrete Plants • Traveling Cranes

produced 380 tons, while remelted scrap accounted for 335 tons.

Little change has taken place in the wire and cable industry. Production of electrical equipment rose slightly and major efforts were directed toward repair, maintenance and manufacture of electrical equipment for railway and streetcar transportation.

Registration of automotive vehicles has dropped one-third to about 100,000, largely because of the lack of spare parts to keep them operating. Allocations of raw materials to parts manufacturers have been increased since truck transport is important to Japan.

Automotive production is at a low point, a small percentage of capacity which in itself is not large. During April, 19 electric autos, seven small cars and 15 motorcycles came from the assembly lines. No figures were available for truck and tractor production.

Two steel ships, totaling 12,000 gross tons, were launched in May, while three totaling 6170 tons, were completed; of the 700 new ships to be constructed for the Japanese merchant fleet, 100 will be of steel with a gross tonnage of 292,000.

New Chevrolet Light Car Project Receives Washington Approval

Cleveland

• • • **Final approval in** Washington of the General Motors Corp.'s application to build two new plants in Cleveland for the new Chevrolet Light Car Div. at a combined construction cost of $15,250,000, was announced by Glenn W. Thompson, manager of the Cleveland office of the Civilian Production Administration.

The two new plants, one in Brook Park Village and the other in Parma, will have a total of 2,500,000 sq ft of floor space upon completion, and represent what is said to be the largest initial operation ever undertaken by General Motors in any one locality. Value of processing machinery to be installed is in the neighborhood of $50,000,000. It is expected that 10,000 workers from local labor markets will be employed in the new plants, at a minimum annual payroll of $25,000,000.

Gallup Polls

(CONTINUED FROM PAGE 95)

marized as follows:

	Pct	
Be firm, make her stick to agreements, no appeasement	28	61
Keep strong military preparedness	28	
Economic blockade	4	
Sever relations with her	1	
Go before the UN	4	11
Get together and work things out	6	
Try to appease Russia	1	
Do nothing, avoid trouble	10	
Miscellaneous and no opinion	22	

The table adds to more than 100 pct because some voters suggested more than one course of action.

In a comparable poll in March the vote for one of the firm policies in the first general category above totaled 50 pct as compared to 61 today. There has been a corresponding decline in the vote favoring either a hands-off policy or a policy of trying to work things out through the UN or otherwise.

Russia's course in world affairs appeals to an even smaller proportion of intellectuals and prominent people in the United States than average voters.

A poll was conducted by the institute among a cross-section of the men and women listed in "Who's Who in America," roster of the great and famous in this country. They were asked whether they approve or disapprove of the course Russia is following in world affairs—the identical question that was asked of the general public.

The vote follows:

	Persons listed in "Who's Who" Pct	General Public Pct
Approve	5	7
Disapprove	88	71
No opinion	7	22

• • • **The 79th Congress,** which closed up shop and went home about 2 weeks ago, faced problems during its term of office as numerous and fateful as any in the history of this nation.

The following question was asked in a nationwide poll:

"In general, do you think the present Congress has done a good job or a poor job?"

Across the country, among those with opinions, sentiment adds up as follows:

	Pct
Good job	23
Fair job	40
Poor job	37

College trained people, and busi-

Vertical Storage with BAKER TRUCKS

more than doubled Storage Facilities

Hy-Lift Truck illustrated has oversize "safety" platform providing greater carrying space. Operator can raise or lower load by remote control from the platform.

(Inset, above) Baker Low-Lift Truck moves capacity load easily up a 10% ramp 70 feet long.

(Below) This 4000 lb. Baker Truck does double duty. Besides its own big load, it hauls a loaded trailer.

In 1926, Merck & Co., Inc. bought its first Baker electric truck. Twelve years ago they found that storage along horizontal lines provided inadequate warehousing space to meet increasing needs. Rather than build an addition, they decided to install a Baker Hy-Lift Truck to tier material, thus using available vertical storage space. So successful was this truck—not only in providing more storage capacity but also in speeding material movement—that more and more were installed, until today the Company operates a fleet of 18 Baker Trucks: Eleven Hy-Lift Trucks, two Low-Lift Trucks, two Fork Trucks, and three Platform Trucks. Besides obviating the need for new building by increasing existing storage facilities, these trucks are conserving time and manpower on handling operations throughout the plant.

A Baker Material Handling Engineer can help you make similar savings. Write for information.

BAKER INDUSTRIAL TRUCK DIVISION *of the Baker-Raulang Company*
2175 West 25th Street • Cleveland 13, Ohio
In Canada: Railway & Power Engineering Corporation, Ltd.

Baker INDUSTRIAL TRUCKS

ness and professional groups are more inclined than others to tab the Congressional performance poor than other groups.

Manual workers, people who voted Democratic in the 1944 presidential election, and voters with a grade school education or less are more inclined than other groups to call Congress' job good.

These facts are shown in the following tables:

	Good Pct	Fair Pct	Poor Pct
Democrats	27	39	34
Republicans	20	40	40
College	15	38	47
High School	21	42	37
Grade or no School	27	39	34
Prof. & business groups	14	40	46
Farmers	23	48	29
White collar	24	38	38
Manual workers	27	38	35

London Economist

(CONTINUED FROM PAGE 101)

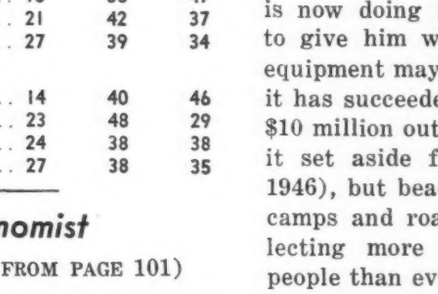
likes to hunt (by which he means to shoot), but hunting jackets are 8 pct higher in price than they were before the OPA did its recent quick-change act. He likes to play baseball, tennis and golf in spite of the continuing ball shortages, to pitch horseshoes when he can get them, to watch horses, dogs and even mechanical rabbits run, though he can hardly push his way through throngs of eager bettors. Every place he goes to is more crowded than it used to be. He grumbles, but he does not let it keep him at home.

The tourist industry, worth $5 or $6 billion a year before the war, is now doing its $10 billion best to give him what he wants. Its equipment may be shabby (so far, it has succeeded in spending only $10 million out of the $360 million it set aside for sprucing up in 1946), but beach hotels, mountain camps and roadside inns are collecting more money from more people than ever before. The tourist cabin that used to charge $1 a night is now accepting $2. A high-class hotel in the Middle Atlantic region asked a man and wife $19 a day for food and lodging before the war, now it asks $27. A summer cottage that rented for $500 a season in 1941 now brings $1500. The rise in every line runs from 15 pct up, not excluding the wayside sandwich, the rowboat and the bicycle.

Attempts to find out how Americans pay such prices must take into account figures of full employment and wage increases, the pressure of unspent war savings, a national income that rose from $96.9 billion in 1941 to $161 billion in 1945, the degree of inflation now current and increasing. More frivolous answers include the suggestion that many tourists are compensating for high prices on food and lodging by doing without clothes. If the vacation season has never been so expensive, neither has it ever been quite so naked. A stranger in resort areas might conclude that the country had been given back to the Indians, who were rapidly reverting to their aboriginal habit of putting moccasins on the feet, breech clouts on the body, and paint on the face, leaving the rest of the skin free to take on a rich tan. City dwellers may buy a bottle of rich tan at any drug store.

That any work at all is being done is surprising, and an index of the degree to which machines run themselves. Figures for the cool month of June show the Federal Reserve index of industrial production at a new postwar peak, but though official predictions hope the July output will be even higher, pessimists look at vacation schedules and shake their heads. The practical necessities of life are still slow to reach the market, but those who cannot find work shirts may buy flower-strewn sport numbers at twice the price. Sunburn, ivy poisoning and hard work may lie ahead, but at this moment America prefers to believe that crops will grow, automobiles roll off the assembly line, houses rise and electric washers take shape while their erstwhile makers lie on their backs in the sun and pay envelopes drop from the sky at regular intervals.

HANNATEN IRON INGOT



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WAA Head Names Six Zone Administrators

Washington

• • • **WAA Administrator** Robert M. Littlejohn has announced the appointment of six zone administrators to act as his personal representatives in handling matters of the 33 WAA Regional Offices requiring Washington headquarters action.

The zone administrators, their headquarters, and the regional offices comprising their respective zones are:

Norman D. Cota, Philadelphia (Philadelphia, Boston, New York and Richmond)

William E. Goe, Atlanta (Atlanta, Charlotte, Jacksonville, Nashville and Birmingham)

Stanley G. Backman, Chicago (Chicago, Cincinnati, Cleveland, Detroit, Louisville and Minneapolis)

H. H. Miller, Kansas City (Kansas City, Denver, St. Louis, and Omaha)

Richard Donovan, Dallas (Dallas, Fort Worth, Houston, San Antonio, Tulsa, Little Rock, and New Orleans)

Paul G. Rutten, San Francisco (San Francisco, Los Angeles, Seattle, Helena, Salt Lake City, Spokane and Portland).

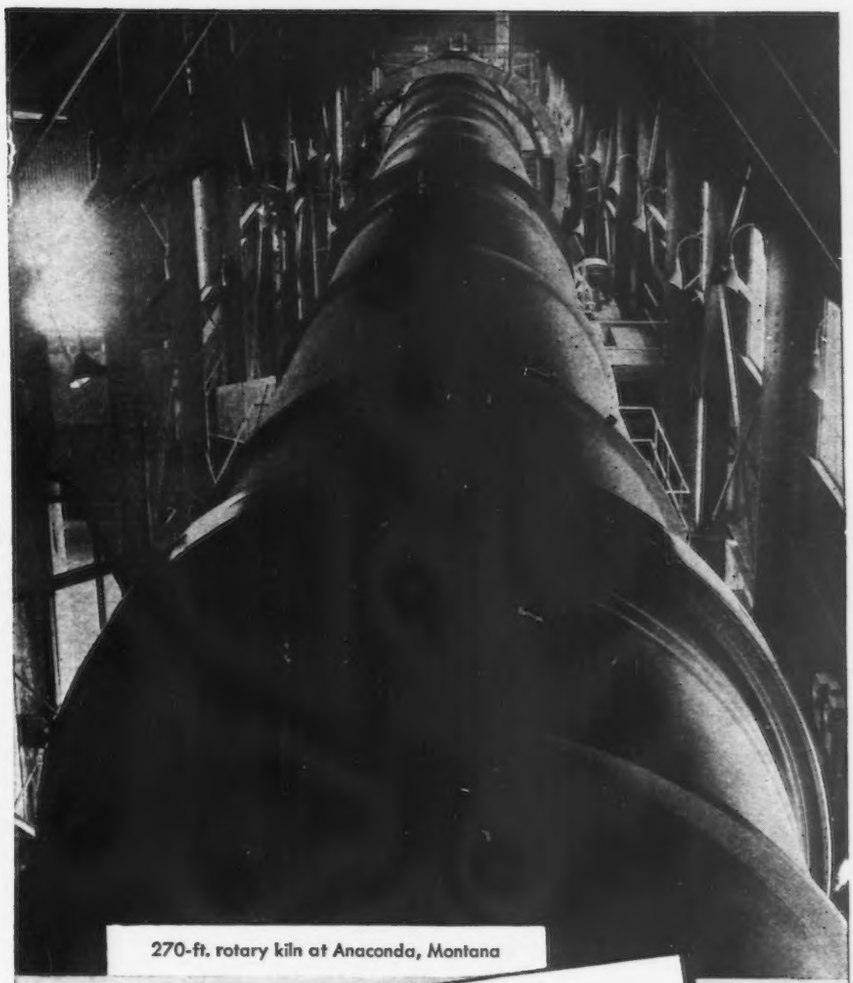
Revise Powder Standards

• • • **The Metal Powder** Assn. has revised its standard for the Tentative Method for Sieve Analysis of Granular Metal Powders, originally issued in June 1945. The revised standard is designated as M.P.A. Standard 5-46T. Copies may be obtained from the association, 420 Lexington Ave., New York 17, for 10¢ a copy.

FTC Dismisses Case

Washington

• • • **FTC has dismissed** a complaint against Emsco Refractories Co., Vernon, Calif., one of 39 corporations and their trade association, American Refractories Institute, of Pittsburgh, charged with conspiracy to fix prices and eliminate competition. Dismissal of the complaint followed the sale of Emsco's assets, including name and goodwill, to Gladding-McBean & Co. and the withdrawal of the company's officers from the refractories business, FTC said.



270-ft. rotary kiln at Anaconda, Montana

Anaconda
MANGANESE
NODULES

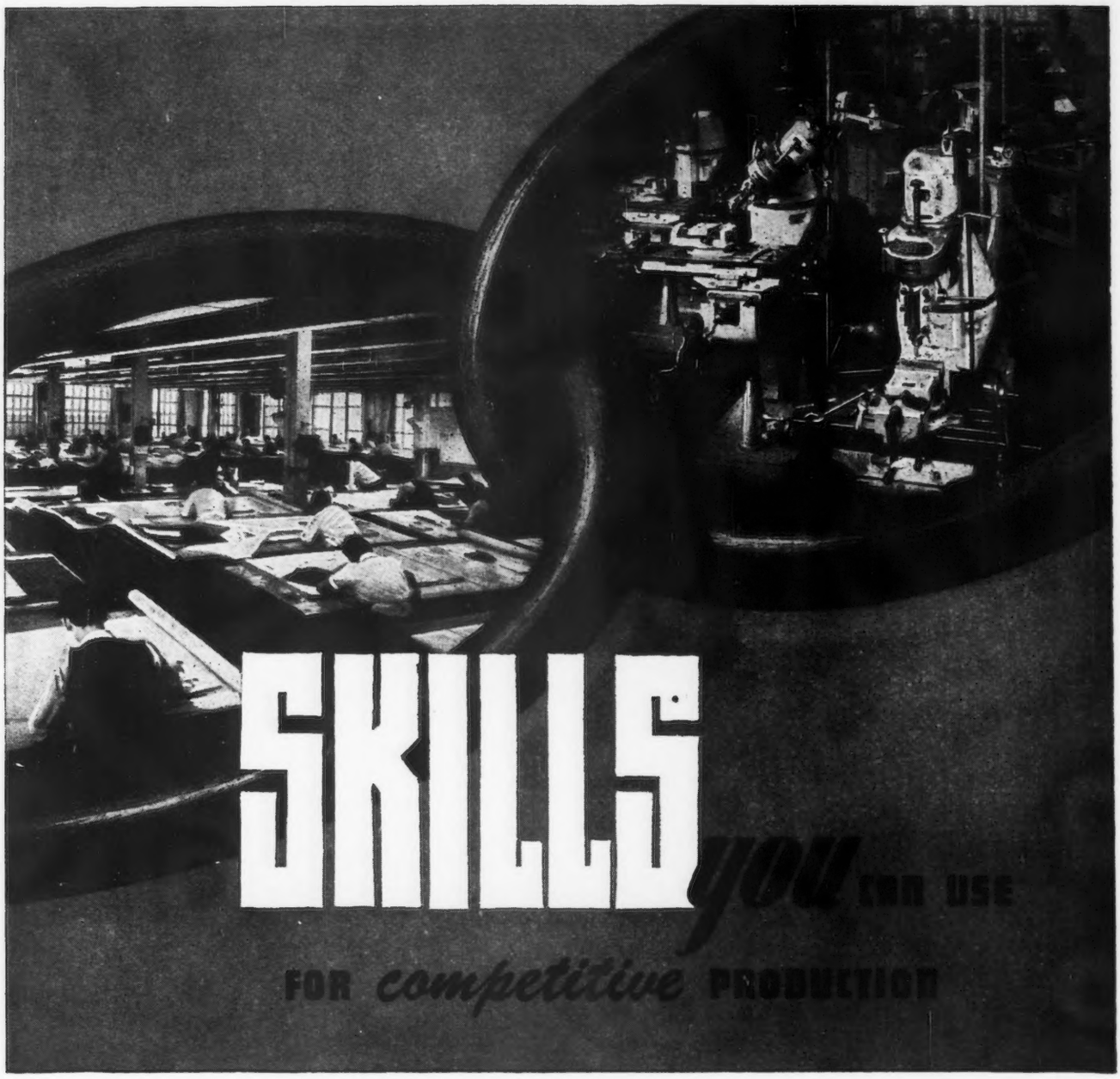
AVERAGE ANALYSIS

Mn	60%
SiO_2	8%
Al_2O_3	0.76%
Fe	3.1%
P	0.06%

46381

ANACONDA
from mine to customer

ANACONDA COPPER MINING COMPANY
Offices: 25 Broadway, New York 4, N. Y.
Anaconda, Montana



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